March 8, 2016

Larry Williams, State Supervisor
U.S. Fish and Wildlife Service
Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

Roxanna Hinzman, Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

Re: Eastern Collier Habitat Conservation Plan public commenting process

Dear State Supervisor Williams and Field Supervisor Hinzman:

The Conservancy of Southwest Florida is writing on behalf of our over 6,000 supporting families regarding the proposed Eastern Collier Habitat Conservation Plan (HCP). As you are aware, the Conservancy has been tracking the proposal very closely since it was first discussed back in 2007. We are very grateful the Service has set up a quarterly system to provide us documents related to the HCP and has responded to our Freedom of Information Act (FOIA) requests.

However, we are concerned about the ability of others to receive information related to the HCP when inquiring with your staff. Two occasions have been reported to us where others have stated they have requested the HCP and it was not provided due to it being a "draft" that was not publicly available.

Now that the applicants have made the April 2015 draft publicly available on their website,[1] we would request the Service to make the document available to those who request it, as well as on the FWS website to help inform the public about the proposal.

As acknowledged by the Service in pursuing an Environmental Impact Statement (EIS), this proposal may have significant impacts on the human environment. The project is controversial,

[1] Accessed February 29, 2016, from <http://www.floridapantherprotection.com/Default.aspx?n=23>.

may impact a large number of people, is large in size, and has a high potential for environmental harm. Transparency and public input for a project such as the one proposed is essential, and therefore, making the HCP more widely available is appropriate.

We appreciate that the Service committed, during our February 11, 2016 meeting, to advertise the upcoming scoping meetings not just in the Federal Register, but also via the FWS website and local newspapers. Further, we understand from speaking recently with Service staff that a website, advertisements throughout south Florida, and translation into different languages will also be done to provide notice of the meeting and opportunities to comment in addition to the meeting date itself. Access to the proposed HCP, which is invariably tied to the EIS, is important and should therefore be made readily available.

If you have any questions, please contact me at (239) 262-0304, ext. 286.

Sincerely,

Amber Crooks
Senior Natural Resources Specialist

Cc:
Jennifer Hecker, Conservancy of Southwest Florida
Tori Foster, FWS
Connie Cassler, FWS
Ken McDonald, FWS

From:	Dryden, Kim
To:	Roxanna Hinzman; Constance Cassler; Donald Progulske; Timothy Breen
Cc:	David Shindle; Kevin Godsea
Subject:	HCP contact list
Date:	Thursday, February 04, 2016 3:21:48 PM

Sorry having trouble keeping up: too much to do. For the HCP, the SFWMD is a major player because they control the basin by basin surface water management for SW FL

Let's not forget a really important point about our Corps partners - in FL they defer the water qualification certification which includes surface water management and water use issues to the water management districts - almost without question, so the SFWMD is a major player in any listed species decision we make. (We have letters from the Corps regulatory inviting us to take a hike on this issue.....). Which is why I have encouraged active participation in the monthly SFWMD interagency project review meetings in Ft. Myers by our staff. We can eliminate fish and wildlife and listed species issues ahead of time by joining int this process that we have not really participated in for many years.

The Big Cypress Basin Board is one of the few basin boards in the state that has survived the governors' cuts and is historically resourced and regionally based and highly political.

The PSRP is the first project that had a much-heralded water reservation under CERP. So for the Big Cypress development, we have water reserved for the project which would change under the Big Cypress Development proposal - ag to development is exceedingly different water use. One thing I recommend for at least the Big Cypress development is that we develop a consensus analysis of the effects of that type of change on fish and wildlife based on best available information. There is generally more undisturbed water resources available for fish and wildlife under ag than there is for development, especially at sensitive times of the year. Plus the pollution issue. A comparison would be advisable.

So: were all the affected Corps and SFWMD CERP contacts copied? Were the SFWMD Big Cypress Basin contacts and the Ft. Myers Lower West Coast SFWMD office contacts copied? Was the Corps Jacksonville and Ft. Myers regulatory office copied?

Were the downstream partners of the Service copied? NMFS, RBNERR, NOAA, ENP, DEP State Parks (Collier Seminole, Fakahatchee?) What about FFS (PSRP, OK Slough) and FWC (WPB and individual WMA's)?

I got to this as soon as I could. If you need specifics, let me know. We should set the same standard for notifying other entities of our actions that we would like to see set for the Service. Thanks.

--
Kim Dryden
U.S. Fish and Wildlife Service
Florida Panther and Ten Thousand Islands National Wildlife Refuge
12085 State Road 29S
Immokalee, FL 34142
CELL PHONE: (**USE FIRST**) 772-532-5614
Office Phone: 239-657-8016 Office FAX: 239-657-8002

From:	amber crooks
To:	"Cassler, Constance"
Cc:	Victoria Foster; LeeAnn Kelso
Subject:	RE: Quarterly upload for ECMSHCP
Date:	Monday, February 08, 2016 11:59:13 AM

Hi Connie,

I am just writing with a reminder that the next quarterly upload for the Eastern Collier HCP is upon us. Please let me know when we might expect the release. If it is available to us prior to our meeting this Thursday 02/11, we can bring any questions we might have on the documents at that time.

I look forward to seeing you all this week. Thank you for your help in making these documents available to us.

In Kind Regards,

Amber Crooks
Amber Crooks, Senior Natural Resources Specialist
Conservancy of Southwest Florida
1495 Smith Preserve Way
Naples, FL 34102
(239)262-0304 ext. 286
amberc@conservancy.org
www.conservancy.org

Protecting Southwest Florida's unique natural environment and quality of life…now and forever.

Please consider the environment before printing this e-mail

From: Cassler, Constance [mailto:constance_cassler@fws.gov]
Sent: Wednesday, November 25, 2015 12:52 PM
To: Christian Spilker
Cc: Victoria Foster; amber crooks; LeeAnn Kelso
Subject: Quarterly upload for ECMSHCP

Hi Christian,

I am attaching a zip file containing all of the releasable documents we have for the East Collier Multi-species HCP from August 2015 thru October 2015. Please upload them to the FTP site.

Thank you for helping us with releasing documents and have a Happy Thanksgiving.

Connie

Constance L. Cassler, Ph.D.
Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
office: 772-469-4243
fax: 772-562-4288
email: constance_cassler@fws.gov

From: Dell, David
To: Mcdonald, Kenneth
Subject: Re: Introduction and Question
Date: Monday, February 08, 2016 1:00:57 PM

---

sure am.

David Dell
Southeast Region
HCP and Safe Harbors Coordinator
404/679-7313
fax: 7081
david_dell@fws.gov

On Mon, Feb 8, 2016 at 1:00 PM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:

> So are you up for a call, now?
>
> On Mon, Feb 8, 2016 at 9:54 AM, Dell, David <david_dell@fws.gov> wrote:
>
> > Yes indeed. If you hang around long enough, there will be a cube in your future.
> >
> > David Dell
> > Southeast Region
> > HCP and Safe Harbors Coordinator
> > 404/679-7313
> > fax: 7081
> > david_dell@fws.gov
> >
> >
> >
> > On Mon, Feb 8, 2016 at 9:33 AM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:
> >
> > > Oh no...is that what the move ended up establishing..cubes?
> > >
> > > On Mon, Feb 8, 2016 at 9:28 AM, Dell, David <david_dell@fws.gov> wrote:
> > >
> > > > Yes, I should be. It'll be a test of how much I disturb my cube neighbors.
> > > >
> > > > David Dell
> > > > Southeast Region
> > > > HCP and Safe Harbors Coordinator
> > > > 404/679-7313
> > > > fax: 7081

david_dell@fws.gov

NOTE: All email correspondence and attachments received from or sent to me are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

On Mon, Feb 8, 2016 at 9:25 AM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:

> Good morning!
>
> Just checking to see if you'd be available for a call this afternoon?
>
> Ken
>
> On Thu, Feb 4, 2016 at 9:02 PM, Dell, David <david_dell@fws.gov> wrote:
>
> > We should discuss when I get back in next week. Implementing agreements are tricky. I'd prefer not to deal with one, but it looks like commitments were made early on.
> >
> > I've been digging into the HCP and considering what they might want. I'm back in Monday, so let's catch up then.
> >
> > David Dell
> > Southeast Region
> > HCP and Safe Harbors Coordinator
> > 404/679-7313
> > fax: 7081
> > david_dell@fws.gov
> >
> > NOTE: All email correspondence and attachments received from or sent to me are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.
> >
> > On Thu, Feb 4, 2016 at 10:44 AM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:
> >
> > > Hi David,
> > >
> > > Just thought I'd circle back and touch base with you regarding the East Collier HCP. I just got off the phone with their consultant and they were expressing a great deal of motivation about initiating the Implementing Agreement. Do you have any insights I can offer them, or ideas you can offer me, about how we go about getting that started and under solicitor review/oversight as soon as possible? So far my read of the HCP is that the IA is nearly as important, maybe a little more so, than the technical side of things I'm reviewing specifically.
> > >
> > > Thank you,

Ken

--
Kenneth McDonald
Fish & Wildlife Biologist
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559
Office: 772.469.4284
Fax: 772.562.4288
kenneth_mcdonald@fws.gov

Energy and persistence will conquer all things

- Benjamin Franklin

--
Kenneth McDonald
Fish & Wildlife Biologist
South Florida Ecological Services Field Office
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Office: 772.469.4284
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kenneth_mcdonald@fws.gov

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From: Dell, David
To: Cassler, Constance
Cc: Vicki Mott
Subject: Re: NOI for ECMSHCP
Date: Monday, February 08, 2016 3:41:24 PM

Connie: Right now Vicki and I are in phone-tag. We can adjust the venue anytime before we send up to PPM for the first editorial review.

If you have the new information, send it up, or send a revised notice. Thanks.

David Dell
Southeast Region
HCP and Safe Harbors Coordinator
404/679-7313
fax: 7081
david_dell@fws.gov

On Mon, Feb 8, 2016 at 3:30 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Hi Again,
>
> As Ken and I were talking, we realized that the applicants may not use the venue currently in the notice. It depends on when the notice will go into the Federal Register. When you finish your review, do you send it back to our Regional Office? If so, we can change the location then.
>
> We are already going to change the date and the email address to Ken McDonald's email.
>
> Thanks,
>
> Connie
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960
> office: 772-469-4243
> fax: 772-562-4288
> email: constance_cassler@fws.gov
>
>

From: Foster, Victoria
To: amber crooks
Cc: Cassler, Constance; LeeAnn Kelso
Subject: Re: Quarterly upload for ECMSHCP
Date: Monday, February 08, 2016 12:52:02 PM

Good Afternoon, Amber,

Connie and I have time blocked on Wednesday afternoon to go through the documents and pull together this quarter's release.

We'll send it as soon as it's ready.

Have a great day!

Victoria Foster
Chief of Staff to the State Supervisor
U.S. Fish and Wildlife Service
1339 20th Street, Vero Beach, FL 32960
Ph: 772-469-4269 Fax: 772-562-4288
E-mail: Victoria_Foster@fws.gov

On Mon, Feb 8, 2016 at 11:58 AM, amber crooks <amberc@conservancy.org> wrote:

> Hi Connie,
>
> I am just writing with a reminder that the next quarterly upload for the Eastern Collier HCP is upon us. Please let me know when we might expect the release. If it is available to us prior to our meeting this Thursday 02/11, we can bring any questions we might have on the documents at that time.
>
> I look forward to seeing you all this week. Thank you for your help in making these documents available to us.
>
> In Kind Regards,
>
> *Amber Crooks*
>
> Amber Crooks, Senior Natural Resources Specialist
>
> Conservancy of Southwest Florida
>
> 1495 Smith Preserve Way

Naples, FL 34102

(239)262-0304 ext. 286

amberc@conservancy.org

www.conservancy.org

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Please consider the environment before printing this e-mail

From: Cassler, Constance [mailto:constance_cassler@fws.gov]
Sent: Wednesday, November 25, 2015 12:52 PM
To: Christian Spilker
Cc: Victoria Foster; amber crooks; LeeAnn Kelso
Subject: Quarterly upload for ECMSHCP

Hi Christian,

I am attaching a zip file containing all of the releasable documents we have for the East Collier Multi-species HCP from August 2015 thru October 2015. Please upload them to the FTP site.

Thank you for helping us with releasing documents and have a Happy Thanksgiving.

Connie

Constance L. Cassler, Ph.D.

Supervisory Fish and Wildlife Biologist

U.S. Fish and Wildlife Service

1339 20th Street

Vero Beach, Florida 32960

office: 772-469-4243

fax: 772-562-4288

email: constance_cassler@fws.gov

From: Dell, David
To: Cassler, Constance
Cc: Vicki Mott; Kenneth Mcdonald
Subject: Re: ECMSHCP Permitt Application Fee
Date: Tuesday, February 09, 2016 6:50:50 AM

We are only announcing the public scoping of the EIS for the HCP. We have not received applications and a complete HCP yet. So as Connie mentioned, we don't have (and don't want them yet) checks either.

David Dell
Southeast Region
HCP and Safe Harbors Coordinator
404/679-7313
fax: 7081
david_dell@fws.gov

On Mon, Feb 8, 2016 at 4:27 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Hi Vicki,
>
> You asked earlier if the we have sent a fee to the Regional Office yet, and I didn't know the answer. I looked in the file and we sent the check the applicants sent in with their application back to the applicants. The concern was that the check would be too old when the HCP is deemed ready to send to the Regional Office. We explained that we would ask the applicants for a money order when we are ready to send the HCP to the RO. As you mentioned on our call, this is the standard procedure for HCPs.
>
> Connie
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960
> office: 772-469-4243
> fax: 772-562-4288
> email: constance_cassler@fws.gov
>
>

From: Bolen, Layne
To: Cassler, Constance
Subject: Re: 20150421_letter_Stantec to Service_Eastern Collier Mutliple Species HC Plan Draft_reducedsize.pdf
Date: Friday, February 19, 2016 4:03:27 PM

Ok, Thanks Connie, I will want to make sure to those who have asked to review it and provide comments or input to understand that this will not be the one and only time for their involvement. Meaning, once they provide comment to not feel as if their role is complete. As you said there will be more formal meetings and I think then coordination from your lead to the commenting biologists.

Layne

Layne Bolen
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
South Florida Ecological Services Field Office
Endangered Species
Vero Beach, FL 32960
email: layne_bolen@fws.gov
phone: 1-772-469-4332
fax: 1-772-562-4288

On Fri, Feb 19, 2016 at 3:52 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Layne,
>
> There is not timeline at this point. We are at the very beginning of the EIS and HCP process. There will be an EIS scoping meeting in March or April to help identify alternatives to be analyzed in the EIS. There will also be and HCP comment period, but not until we have an HCP for which we think we can issue a permit. I think that is many months away. Paula and others had asked to see the document so they can comment, and Roxanna suggested a Google Doc.
>
> I know Ken has plans to meet with species leads as a group to give an overview of the HCP and talk about the feedback he would like from them. I'm not sure when that will be, but at least you can tell them it is coming soon.
>
> I hope this helps.
>
> Connie
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960

office: 772-469-4243
fax: 772-562-4288
email: constance_cassler@fws.gov

On Fri, Feb 19, 2016 at 3:27 PM, Bolen, Layne <layne_bolen@fws.gov> wrote:

> Connie, Is there a timeline with deadline to provide comments?
>
> Thanks,
> Layne
>
> Layne Bolen
> Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> South Florida Ecological Services Field Office
> Endangered Species
> Vero Beach, FL 32960
> email: layne_bolen@fws.gov
> phone: 1-772-469-4332
> fax: 1-772-562-4288
>
>
>
> On Fri, Feb 19, 2016 at 2:33 PM, Constance Cassler (via Google Drive) <constance_cassler@fws.gov> wrote:
>
> > Constance Cassler has shared the following PDF:
> >
> > 20150421_letter_Stantec to Service_Eastern Collier Mutliple Species HC Plan Draft_reducedsize.pdf
> >
> > We have received many requests from staff to see and be able to comment on the E.Collier Multispecies HCP. Now that Ken McDonald is on board as the project biologist for the HCP, we are ready to move forward with further review of the HCP. Many thanks to Kevin Palmer for the initial review. To give whoever wants a chance to comment on the document when it is convenient, we have created a Google document. Please keep in mind the Service was not involved in the development of the HCP

document. Also, we are at the very beginning of the process, so there is plenty of time to comment.

Please don't share this outside of the Service without checking with Ken first.

We look forward to your comments.

Connie

Open

From: Cassler, Constance
To: FW4 Vero Beach SFFO
Subject: Re: 20150421_letter_Stantec to Service_Eastern Collier Mutliple Species HC Plan Draft_reducedsize.pdf
Date: Friday, February 19, 2016 3:18:34 PM

Hi Everyone,

The Google Doc version did not display the maps correctly. To resolve this I sent a link to the Lumin app associated with Google Drive. Please make all comments in the Lumin version so we can all see the comments. Thanks for your patience as we work with new technology.

Connie

Constance L. Cassler, Ph.D.
Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960
office: 772-469-4243
fax: 772-562-4288
email: constance_cassler@fws.gov

On Fri, Feb 19, 2016 at 2:33 PM, Constance Cassler (via Google Drive) <constance_cassler@fws.gov> wrote:

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> 20150421_letter_Stantec to Service_Eastern Collier Mutliple Species HC Plan Draft_reducedsize.pdf
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>
> Please don't share this outside of the Service without checking with Ken first.
>
> We look forward to your comments.

Connie

Open

Google Drive: Have all your files within reach from any device.

From: Constance Cassler (via Google Drive)
To: fw4_vero_beach_sffo@fws.gov
Subject: 20150421_letter_Stantec to Service_Eastern Collier Mutliple Species HC Plan Draft_reducedsize.pdf
Date: Friday, February 19, 2016 2:33:53 PM

Constance Cassler has shared the following PDF:

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Please don't share this outside of the Service without checking with Ken first.

We look forward to your comments.

Connie

Open

From: Mcdonald, Kenneth
To: Dell, David
Subject: Re: East Collier HCP in Word?
Date: Wednesday, March 02, 2016 10:25:23 AM

EASTERN COLLIER MULTIPLE SPECIES HCP First D...

I agree completely with what you're finding. I've attached a Word version converted from our PDF copy. It's large so it's coming as a link to Google Drive. Let me know if you can't get to it and we'll figure out a different way.

Ken

On Wed, Mar 2, 2016 at 10:06 AM, Dell, David <david_dell@fws.gov> wrote:

> Ken: Do you have a version of the HCP in Word? I have a hard copy plastered with stickie notes, but I think it might be helpful if we had a google docs version that we could collaborate on.
>
> I'm slowly coming to grips with this HCP, but it appears to hinge a lot on the 2008 MOU among the landowners and NGOs, as well as on the Rural land Stewardship program, and something called a Florida Panther protection plan. Those need to be incorporated into the HCP. I also don't see yet where they make the case that their plan minimizes and mitigates to the maximum extent practicable.
>
> David Dell
> Southeast Region
> HCP and Safe Harbors Coordinator
> 404/679-7313
> fax: 7081
> david_dell@fws.gov
>
>

--

Kenneth McDonald
Fish & Wildlife Biologist
South Florida Ecological Services Field Office
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Vero Beach, Florida 32960-3559
Office: 772.469.4284
Fax: 772.562.4288
kenneth_mcdonald@fws.gov

Energy and persistence will conquer all things

- *Benjamin Franklin*

From: Foster, Victoria
To: Cassler, Constance
Subject: Re: Conservancy of Southwest Florida letter regarding public process for Eastern Collier HCP
Date: Thursday, March 10, 2016 2:58:14 PM

Makes sense to me. Perhaps we can put a blurb on our website that we're reviewing it and just add the link to the applicants' website?

Victoria Foster
Chief of Staff to the State Supervisor
U.S. Fish and Wildlife Service
1339 20th Street, Vero Beach, FL 32960
Ph: 772-469-4269 Fax: 772-562-4288
E-mail: Victoria_Foster@fws.gov

On Thu, Mar 10, 2016 at 2:50 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Hi Everyone,
>
> Why can't we direct the public to the applicants website where the HCP is provided.
>
> Connie
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960
> office: 772-469-4243
> fax: 772-562-4288
> email: constance_cassler@fws.gov
>
>
>
> On Tue, Mar 8, 2016 at 12:41 PM, amber crooks <amberc@conservancy.org> wrote:
>
> > Dear State Supervisor Williams and Field Supervisor Hinzman,
> >
> > Please see the attached letter from the Conservancy of Southwest Florida regarding the public process for the proposed Eastern Collier Habitat Conservation Plan.
> >
> > If you have any questions or would like to discuss further, feel free to contact me.

Thank you,

Amber Crooks

Amber Crooks, Senior Natural Resources Specialist

Conservancy of Southwest Florida

1495 Smith Preserve Way

Naples, FL 34102

(239)262-0304 ext. 286

amberc@conservancy.org

www.conservancy.org

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March 8, 2016

Larry Williams, State Supervisor
U.S. Fish and Wildlife Service
Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

Roxanna Hinzman, Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

Re: Eastern Collier Habitat Conservation Plan public commenting process

Dear State Supervisor Williams and Field Supervisor Hinzman:

The Conservancy of Southwest Florida is writing on behalf of our over 6,000 supporting families regarding the proposed Eastern Collier Habitat Conservation Plan (HCP). As you are aware, the Conservancy has been tracking the proposal very closely since it was first discussed back in 2007. We are very grateful the Service has set up a quarterly system to provide us documents related to the HCP and has responded to our Freedom of Information Act (FOIA) requests.

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[1] Accessed February 29, 2016, from <http://www.floridapantherprotection.com/Default.aspx?n=23>.

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If you have any questions, please contact me at (239) 262-0304, ext. 286.

Sincerely,

Amber Crooks
Senior Natural Resources Specialist

Cc:
Jennifer Hecker, Conservancy of Southwest Florida
Tori Foster, FWS
Connie Cassler, FWS
Ken McDonald, FWS

From: Mcdonald, Kenneth
To: Shindle, David
Subject: Re: Eastern Collier visit
Date: Monday, March 14, 2016 9:20:47 AM

Will do. Thanks!

On Mon, Mar 14, 2016 at 9:11 AM, Shindle, David <david_shindle@fws.gov> wrote:

> OK, 10-4. It sounds like some detailed mechanics being worked out that I may not need to participate in. Sounds like you are on top of this.
>
> Just let me know if/when you need my input.
>
> David

David Shindle
Florida Panther Coordinator
U.S. Fish and Wildlife Service
12085 State Road 29 S
Immokalee, FL 34142
Office 239-657-8013
Cell 772-532-7293
david_shindle@fws.gov

On Mon, Mar 14, 2016 at 8:15 AM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:

> Will do.
>
> Just to fill you in so you can make a more informed decision about attending - the agenda for the 16th is a discussion of how the applicants intend to manage the areas they designate as "preserves" in the HCP. Principally, I'm interested in what the mechanism will be for exchanging mitigation credits between landowners. Some in the "covered activities" area have a surplus of lands in the "preserve" to cover their own mitigation needs, while others have a deficit (more land in the covered activities area than the preserve) and will need to utilize credits held by those with surpluses.
>
> Secondly, I'm also interested in understanding how they'll utilize the fund they're proposing to engage in habitat restoration inside the preserve, and what legal instruments they'll use to guarantee protections in the preserve will last at least as long as the HCP, if not in perpetuity. We already have a commitment in principle from them to guarantee the value of habitat in the space designated for "preserves" will increase for panthers through a combination of protection and restoration. The meeting on the 16th is really about us getting that commitment on paper and spelled out more explicitly.
>
> Ken

On Mon, Mar 14, 2016 at 7:54 AM, Shindle, David <david_shindle@fws.gov> wrote:

Good Morning Ken-

I just realized I had the HCP meetings scheduled on the 16th and 17th in my calendar. Maybe there was a change I missed. That said, I have another panther meeting to attend on the 15th. If you need me there on the 16th, just let me know.

David

David Shindle
Florida Panther Coordinator
U.S. Fish and Wildlife Service
12085 State Road 29 S
Immokalee, FL 34142
Office 239-657-8013
Cell 772-532-7293
david_shindle@fws.gov

On Mon, Mar 7, 2016 at 8:20 AM, Mcdonald, Kenneth <kenneth_mcdonald@fws.gov> wrote:

Hello all,

FYI on the agenda. The 14th and 15th are about getting me and anyone else who needs to be up to speed on the layout of the project. The 16th is sitting down with the applicants to spitball how they might trade mitigation credits with one another in the preserve area. Any and all are welcome to come!

Ken

---------- Forwarded message ----------
From: **Christian Spilker** <CSpilker@collierenterprises.com>
Date: Thu, Mar 3, 2016 at 3:32 PM
Subject: Eastern Collier visit
To: Kenneth Mcdonald <kenneth_mcdonald@fws.gov>

Ken,

A draft agenda for your visit is attached. Please let me know if you want to add or remove anything.

--
Kenneth McDonald
Fish & Wildlife Biologist
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559
Office: 772.469.4284
Fax: 772.562.4288
kenneth_mcdonald@fws.gov

Energy and persistence will conquer all things

- Benjamin Franklin

--
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Eastern Collier Multiple Species Habitat Conservation Plan
Agenda for Site Visit and Kick-off Meeting
Collier County, Florida
March 14-16, 2016

Monday March 14, 2016

3-5 p.m.	Bruce Johnson, James Hale, and Ken McDonald meet to review GIS and PHU Analysis (Stantec Offices, 3200 Bailey Ln #200, Naples)

Tuesday March 15, 2016

9-11 a.m.	Helicopter Tour of HCP Area (Meet at Immokalee Airport at 9 a.m.)
12-1 p.m.	Lunch at Lozano's Mexican Restaurant
1-5 p.m.	Driving/walking tour of HCP Area

Wednesday March 16, 2016

9 a.m.-2 p.m. Meeting To Discuss Details of HCP and Implementing Agreement (Collier Enterprises Offices)

- Overview of HCP
- Technical Issues
- HCP Process-related Issues

From:	Robert Tawes
To:	roxanna_hinzman@fws.gov; ken_warren@fws.gov; constance_cassler@fws.gov
Subject:	Fwd: SCHEDULED: Document Number - 2016-06792
Date:	Tuesday, March 22, 2016 1:23:05 PM

FYI. Couldn't find Ken's email on the iPad

Sent from my iPad

Begin forwarded message:

> **From:** "Prigan, Sara" <sara_prigan@fws.gov>
> **Date:** March 22, 2016 at 12:43:22 PM EDT
> **To:** David Dell <david_dell@fws.gov>, Robert Tawes <robert_tawes@fws.gov>, Travis Culp <travis_culp@fws.gov>
> **Cc:** Anissa Craghead <Anissa_Craghead@fws.gov>, Susan Wilkinson <susan_wilkinson@fws.gov>, Megan Apgar <megan_apgar@ios.doi.gov>
> **Subject: Fwd: SCHEDULED: Document Number - 2016-06792**
>
> Draft Environmental Impact Statement; Eastern Collier Multi-species Habitat Conservation Plan; Collier County, Florida [FWS–R4–ES–2016–N037] David Dell , Robert Tawes, Travis Culp
>
> **FR00002539**
>
> **Please see publication information below.**
>
> Thank you,
>
> *Sara Prigan*
> *Division of Policy, Performance, and Management Programs*
> *U.S. Fish and Wildlife Service*
> *5275 Leesburg Pike, MS: BPHC*
> *Falls Church, VA 22041-3808*
> *Telephone: 703-358-2508*
> http://www.fws.gov/pdm/index.html
>
> ---------- Forwarded message ----------
> From: **noreply@fedreg.gov**
>
> **Document 2016-06792, Category NOTICES has been scheduled to publish on 03-25-2016.**
> **This document will be placed on public inspection on 03-24-2016 08:45:00.**

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[FWS–R4–ES–2016–N037]; [40120–1112–0000–F2]

Draft Environmental Impact Statement; Eastern Collier Multi-species Habitat Conservation Plan; Collier County, Florida

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent; announcement of public meeting.

SUMMARY: Under the National Environmental Policy Act (NEPA), we, the Fish and Wildlife Service (Service), advise the public that we intend to gather information necessary to prepare a draft environmental impact statement (dEIS) related to an anticipated permit application from nine Collier County, Florida, landowners (prospective applicants) for the incidental take of federally listed species. The permit application would include an Eastern Collier Multiple Species Habitat Conservation Plan (ECMSHCP) prepared in accordance with the Endangered Species Act of 1973, as amended (Act). We provide this notice to (1) describe the anticipated action; (2) advise other Federal and State agencies, affected Tribes, and the public of our intent to prepare a dEIS; (3) announce the initiation of a public scoping period; and (4) obtain suggestions and information on the scope of issues and alternatives to be included in the dEIS as well as any other written data, views, or arguments with respect to the anticipated permit application.

From: Warren, Ken
To: Cassler, Constance
Subject: Re: Eastern Collier Multi-Species HCP Q&A
Date: Thursday, March 31, 2016 2:42:25 PM

And one more:

Why doesn't the Service designate critical habitat for the Florida panther in SW Florida? Wouldn't that solve any problems with this and future developments proposed right in the heart of the panther's last breeding zone?

On Thu, Mar 31, 2016 at 2:37 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Thanks Ken. We will work on these answers.
>
> Connie
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960
> office: 772-469-4243
> fax: 772-562-4288
> email: constance_cassler@fws.gov
>
> NOTE: All email correspondence and attachments received from or sent to me are subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties
>
> On Thu, Mar 31, 2016 at 2:29 PM, Warren, Ken <ken_warren@fws.gov> wrote:
>
> > Hi Ken and Connie,
> >
> > As we get close to the public meeting, we need to develop some in-house messaging and Q&A we can use in response to media and general public queries. In other words, what are the tough questions we need to be ready to answer as we work thru this process.
> >
> > Anyway, I know y'all are swamped, but here's my shot at the top 5 questions we need to be ready to answer:
> >
> > 1. Why is the Service working with landowners to help them develop a plan that will lead to the development of already diminishing panther habitat, right in the middle of the last Florida panther's last breeding area? It seems as though the Service ought to be trying to stop this.
> >
> > 2. Why doesn't the Service acknowledge the fact that if this development is allowed to occur, it will destroy a significant amount of critical Florida panther habitat and possibly lead to the extinction of this species?
> >
> > 3. If the Service and these landowners can't agree on a conservation plan, what's to stop them from going ahead with developing all this panther habitat?

4. Explain how this habitat conservation plan, if implemented, is anything but a "license to kill and develop" for these landownders?

5. Doesn't the ESA have a provision that even private landowners can't do stuff that will impede or threaten the continued existence of a listed species? And if so, isn't that the case here? Afterall, there are only about 200 Florida panthers left.

Pls let me know your thoughts.

Thanks.
--
Ken Warren
Public Affairs Officer
U.S. Fish & Wildlife Service
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1339 20th Street
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Office Phone: 772.469.4323
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--
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From: Cassler, Constance
To: Julie Morris
Subject: Re: Panther HCP
Date: Tuesday, April 05, 2016 8:29:12 AM

Hi Julie,

I hope you are doing well. The HCP can be found on the website for the EIS:
http://easterncollierhcpeis.com/related-links-documents/

Connie

Constance L. Cassler, Ph.D.
Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
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fax: 772-562-4288
email: constance_cassler@fws.gov

On Mon, Apr 4, 2016 at 10:44 AM, Julie Morris <jmorris@floridaconserve.org> wrote:

> Hi!
> Would I be able to get a copy of the draft HCP for Collier? I'm very interested.
>
> I hope all is well with you -- I hear you are really busy these days!
> Julie
>
> Julie Morris
> 941.234.7201

From:	Warren, Ken
To:	FW4 ALL Florida ES Users; Pride, Tom
Cc:	Katherine Taylor; Jeff Fleming
Subject:	Naples Daily News Guest Commentary: Finding meaning in a Florida panther viral video — a call to action
Date:	Tuesday, April 05, 2016 1:43:19 PM

http://www.naplesnews.com/opinion/perspectives/guest-commentary-finding-meaning-in-a-panther-viral-video--a-call-to-action-2f8877c1-4615-6899-e053--374380681.html

Guest commentary: Finding meaning in a Florida panther viral video — a call to action

Naples Daily News, April 4, 2016
By Jason Lauritsen And Brad Cornell, Director Corkscrew Swamp Sanctuary, Southwest Florida Policy Associate Audubon of the Western Everglades/Audubon Florida

Last week, a guest at Audubon's Corkscrew Swamp Sanctuary had the experience of a lifetime — and it was all captured on video.

You may have seen the remarkable footage online. In the video, you can see an endangered Florida panther walking on Corkscrew's famous boardwalk until he turns the corner and in an unexpected reversal of roles, appears to panic at the sight of a human. The startled cat speeds up, racing past the videographer's leg. It's a classic hold-your-breath-moment if there ever was one.

The reality behind the highly entertaining video is a sober and uncertain one. The young cat will likely remain on the move with no home range of his own until he reaches maturity and can defend his territory. In his search, he will be forced to skirt residential communities and new developments, avoid dominant male panthers in their prime, and dodge speeding cars on increasingly congested highways. Last year we broke the record for panthers killed by cars at 26 individuals. That is a shocking number given that state biologists estimate that only 180 or so of these magnificent animals remain.

We have a collective obligation to conserve habitat at a meaningful scale, mindful of the threats and befitting the needs of wide-ranging animals like panthers.

To prevent any further population declines of this iconic Florida species, Audubon scientists, policy advocates, and volunteers are working alongside other conservation partners to protect and restore the habitat that panthers need to survive.

We reach across the fence to work with our neighbors because any meaningful solution demands it. Our 13,000 acres are not nearly enough. Just one adult male panther has a home range up to 200 square miles, nearly 10 times the size of Corkscrew Swamp Sanctuary. Like the Florida panther, Corkscrew Swamp and the Everglades cannot survive without help. It's now up to us to restore and protect the surrounding watersheds and the full range of unique habitats found in South Florida.

Many large conservation areas, like Corkscrew Swamp Sanctuary, Everglades National Park, and Big Cypress Preserve, must also be linked together by protected corridors to achieve maximum ecological results. Unfortunately, increasing development pressures now threaten to

limit or foreclose these links and undo habitat protection and restoration goals.

State, local and federal governments, plus rural communities and ranchers, must work together to protect what's left of the panther's natural habitat and expand north — before it's too late. The options include land acquisition, sustainably planned and located human communities, and perhaps most critically — incentives for landowners and ranchers to "grow panthers."

A good example of how to incentivize landowners to grow panthers is called Habitat Conservation Planning (HCP), which is a federal Endangered Species Act program. HCPs seek to balance all the human and habitat issues in a specific area for a sustainable outcome for imperiled species.

Currently, there is a new HCP being developed in eastern Collier County on 152,000 acres north of the Florida Panther Refuge. Still in draft form, the Eastern Collier Multi-species HCP would mandate that each new development project use only old farm fields and sets aside about two times more preserved and restored prime habitat.

The aim of this HCP is to protect panthers, wood storks, and many other imperiled Everglades species, so Audubon and our allies are engaged directly with the landowners and federal agencies to produce the most protective and sustainable plan. We firmly believe the HCP process and other incentive-based collaborations hold great promise for the future of panthers and the Western Everglades/Corkscrew Swamp landscape.

Thinking in legacy terms, our children and grandchildren would be best served if we took the naturalist Aldo Leopold's conservation maxim to heart: "To keep every cog and wheel is the first precaution of intelligent tinkering."

It is well within our grasp to conserve the ecological cog that is the Florida panther.

There is a public scoping meeting for this Eastern Collier HCP on Tuesday, April 12, from 5-7 p.m. at the University of Florida IFAS/County Extension Auditorium next to the Fairgrounds. More information is online: www.easterncollierHCPEIS.com.

--
Ken Warren
Public Affairs Officer
U.S. Fish & Wildlife Service
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1339 20th Street
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From: Hinzman, Roxanna
To: Cassler, Constance
Subject: Re: ECMSHCP request and MOU
Date: Wednesday, April 06, 2016 10:38:12 AM

Ken can do it. Depending on the timing - I might want to come along. I'd like to hear about the motivations.

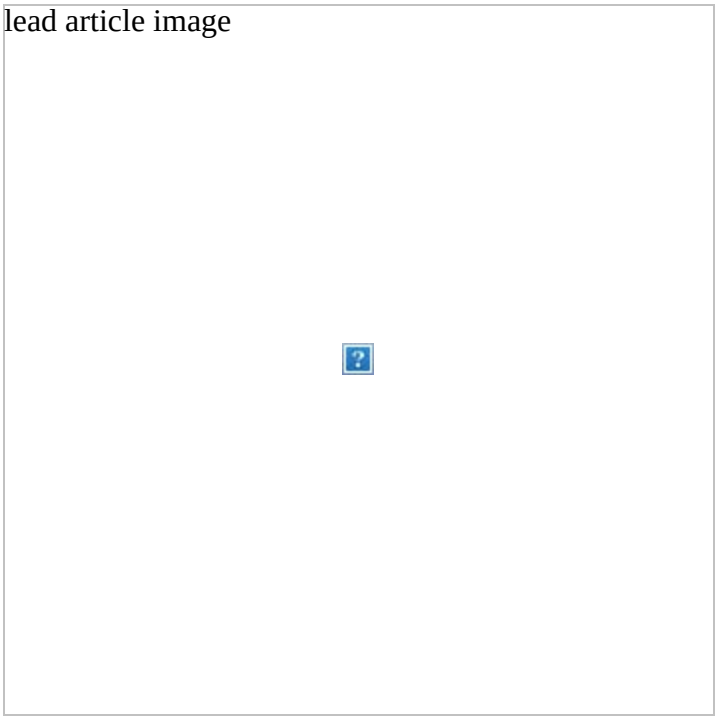
Roxanna Hinzman
U.S. Fish and Wildlife Service
South Florida Ecological Services Field Office
Field Supervisor
1339 20th Street
Vero Beach, FL 32960
772-562-3909 x 309
Cell 772-532-1247
Fax 772-562-4288
roxanna_hinzman@fws.gov

On Tue, Apr 5, 2016 at 3:01 PM, Cassler, Constance <constance_cassler@fws.gov> wrote:

> Hi Roxanna,
>
> Ken had a conversation with Brad Cornell (Audubon) who asked Ken if he would come and talk to the Collier County Board of County Commissioners about the HCP timeline and opportunities for commenting on the morning of April 12th. Ken heard about other motivations he can fill you in on. My question is if this is something you want him to do or if it is something you would prefer to do yourself with a briefing from Ken. Ken is available that morning.
>
> The other question about the MOU was one Janice got from someone in the RO asking under what authority we are signing the MOU? We aren't sure what type of response they are looking for. Do you know? I'll forward the email so you can see the context.
>
> Thank you,
>
> Connie
>
>
> Constance L. Cassler, Ph.D.
> Supervisory Fish and Wildlife Biologist
> U.S. Fish and Wildlife Service
> 1339 20th Street
> Vero Beach, Florida 32960
> office: 772-469-4243
> fax: 772-562-4288
> email: constance_cassler@fws.gov
>

From:	Ken Warren
To:	FW4 Vero Beach SFFO
Cc:	Kevin Godsea; Jeff Fleming; Katherine Taylor; Tom MacKenzie; tom.pride@aecom.com
Subject:	Naples Daily News: Eastern Collier HCP blasted by residents
Date:	Tuesday, April 12, 2016 11:24:18 PM

Plan by large landowners to preserve, develop Collier land blasted by residents



0

By Eric Staats of the Naples Daily News
April 12, 2016 8:44 p.m.

A standing-room-only crowd lambasted a proposal Tuesday by large landowners to receive a federal permit to remake eastern Collier County into a mix of new towns and preserves.

The U.S. Fish and Wildlife Service, which held the public input session, is reviewing a Habitat Conservation Plan, or HCP, that would be the basis for a proposed 50-year permit that would allow development to impact 10 federally listed species.

The HCP includes some of the last occupied habitat of the endangered Florida panther but also would consider impacts to species like wood storks, sandhill cranes, bonneted bats and eastern indigo snakes.

The plan would span 152,000 acres of crops, groves, pasture and natural lands around Immokalee, preserving 107,000 acres in return for development on up to 45,000 acres.

For 90 minutes, some 40 speakers stepped to a podium in an auditorium at the University of Florida agricultural extension office in Golden Gate Estates to have their say, some raising their voices in anger and one man using much of his allotted two minutes to stand in silence in

opposition.

Landowners, who didn't speak Tuesday, have pitched the plan as a good trade-off and better for endangered species protection than piecemeal permitting. But speakers accused landowners of being greedy and being only interested in making money.

"It's absolutely ludicrous," said Bobbie Lee Davenport, of the Cypress Cove Conservancy. "This is just a travesty. If this is allowed under the Endangered Species Act, we have a real problem here."

Several speakers questioned calling the landowner plan a conservation plan, calling it instead an excuse to destroy habitat.

"The plan should concentrate on saving the wildlife, not on saving development land," said opponent Aaron Canott.

Though most of Tuesday's speakers dismissed the HCP out of hand, the session was intended to provide federal reviewers with public input on what issues should be considered during a far-ranging Environmental Impact Statement, or EIS, that would weigh the effect of the HCP. Besides endangered species and habitat, issues to be considered include water supply, air quality, cultural resources, landscape views, roads, climate change and socioeconomics.

It could be two years before the agency makes a decision. An initial public comment period runs until April 25. More input sessions are required at future stages of the review.

"We're 100 percent on the fence," said Ken McDonald, who is overseeing the Fish and Wildlife Service review of the proposed HCP and the development permit that would come with it. "We're only at the beginning. We're nowhere near a decision yet."

More information is available at www.EasternCollierHCPEIS.com.

Sent from my iPhone

From:	Ken Warren
To:	FW4 Vero Beach SFFO; Kevin Godsea
Cc:	Katherine Taylor; tom.pride@aecom.com
Subject:	Eastern Collier County Multiple Species HCP EIS Public Meeting
Date:	Wednesday, April 13, 2016 1:50:49 PM
Attachments:	Untitled attachment 25360.txt IMG_2037.JPG

There was a tremendous turnout for our public meeting held last night in Naples regarding EIS for subject HCP. About 150 people attended in person, with another 45 or so watching a live web cast. About 40 folks made oral comments at the meeting. Kudos to Rox for running an excellent meeting & to Ken McDonald for handling presentation & media duties like a pro. Connie, David Shindle & Kevin Godsea were also there to lend helping hands. Kudos also to Tom Pride & his staff at AECOM for pulling together the logistical support needed to conduct this meeting. This photo was taken with the panoramic function on my smart phone. You can see Ken at podium on far left addressing the standing-room-only crowd.

Sent from my iPhone

From: Mcdonald, Kenneth
To: Randy Kautz
Subject: Re: Shape File from PRT Report
Date: Wednesday, April 20, 2016 1:50:38 PM

Thank you Randy!

On Wed, Apr 20, 2016 at 1:28 PM, Randy Kautz <randykautz@comcast.net> wrote:

> Kenneth,
>
> Attached is a zip file that is a shape file of the additional areas of the East Collier RLSA proposed for protection by the PRT. The zip file has an extension of zi_ because some email servers block zip files. Just change the extension back to zip and extract it. If you have any questions about it, feel free to call.
>
> Randy
>
> Randy Kautz
> 2625 Neuchatel Drive
> Tallahassee, FL 32303
> Cell: 850-443-3014

--
Kenneth McDonald
Fish & Wildlife Biologist
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559
Office: 772.469.4284
Fax: 772.562.4288
kenneth_mcdonald@fws.gov

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- Benjamin Franklin

From: Warren, Ken
To: FW4 Vero Beach SFFO
Cc: Tom MacKenzie; Katherine Taylor; Kevin Godsea; Pride, Tom
Subject: Orlando Sentinel Report: South Florida developers target panther land
Date: Friday, April 22, 2016 3:20:43 PM

http://www.orlandosentinel.com/news/environment/os-orlando-panther-protest-20160422-story.html

South Florida developers target panther land

By Kevin Spear
The Orlando Sentinel, April 22, 2016

Any hope that South Florida's endangered panthers will eventually spread hundreds of miles north to as far the Orlando area and beyond may hinge on a proposal for immense development near Naples.

A growth plan by nine Collier County landowners encompasses 152,124 acres, an area that spans important panther territory and is nearly as big as some counties in the state.

Amid that expanse, construction of subdivisions and business areas would claim 45,000 acres. The remaining 107,000 acres would be set aside for protection of panthers and other imperiled wildlife, a trade-off triggering sharply divided reaction from environmentalists.

Audubon Florida backs the proposal as smart planning for such a large area, but Emily Ruff of Orlando, who opposes Florida's revived hunting of bears, said giving up any of the perilously little habitat for panthers would push them toward extinction.

"It's hard to see how this plan could ever be acceptable," said Ruff, who has organized Orlando-area residents in opposition to the project.

The land belongs to prominent sugar, citrus and cattle enterprises, including a ranch owned by Aliese Priddy. In 2012, Gov. Rick Scott appointed her as a member of the state Fish and Wildlife Conservation Commission.

While that state agency has a role in protecting panthers, the development proposal is now navigating complex bureaucracy of the U.S. Fish and Wildlife Service.

A potential outcome would be the agency issuing a permit within two years for "incidental take" of panthers.

Such a permit essentially would authorize unintentional harm to the animals –for example, if they are forced off territory by a builder or hit by a car.

Ken McDonald, the service's lead biologist reviewing the development proposal, said his agency ultimately will determine a specific quota for incidental take but much remains to be learned before then.

"Anybody offering an opinion about whether or not this action would help or hinder the survival of the species, I would like to see analysis informing that opinion," McDonald said. "Because I haven't done the analysis yet and I'm not aware of anyone who has."

Still not clear, he said, is the number of panthers, thought to be a few hundred, or whether the species is stabilizing sufficiently after a plunge toward extinction.

McDonald said an incidental-take permit would be issued "only if it wouldn't appreciably reduce the likelihood of the survival and recovery" of panthers.

Key to an incidental-take permit will be the agency's examination of details behind the concept of protecting more than 107,000 acres to compensate for environmental damage from developing 45,000 acres.

To Ruff of Orlando it makes little sense that such a vast spread of roads and rooftops into the heart of panther country would improve the cat's plight.

Also critical of the proposal is the Conservancy of Southwest Florida, which is dedicated to environmental protection in Collier and four neighboring

counties.

Among the group's concerns is potential habitat loss for other rare species, including the scrub jay, caracara, wood stork, red-cockaded woodpecker, snail kite, indigo snake and bonneted bat.

Likely to occur, according to the group, would be ripples of additional development triggered by construction within the 45,000 acres.

"Our primary objection is not that development is going to go there, or even how much development, but it's the location on what's considered primary panther habitat," said Rob Moher, the group's chief executive officer.

Brad Cornell, policy associate with Audubon Florida and the Audubon of the Western Everglades chapter, supports the development proposal.

He said landowners' quest for a take permit is tied to broad and stringent requirements of Collier County's Rural Lands Stewardship Area program.

Cornell said the 45,000 acres are poor or marginal for panther habitat and the remaining 107,000 acres will be improved and set aside for permanent protection.

"There are ways this plan can be improved," he said. "But the concept, we think, is an excellent concept."

--
Ken Warren
Public Affairs Officer
U.S. Fish & Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960-3559
Office Phone: 772.469.4323
Mobile Phone: 772.643.4407
Fax: 772.778.5498

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From: Camp, Patricia
To: Constance Cassler
Subject: mailing lists
Date: Monday, April 25, 2016 10:53:26 AM
Attachments: 1.Agency and Officials Mailing List for Scoping Mtg_29Mar2016.xls

---

--
Patti Camp
US Fish and Wildlife
1339 20th St
Vero Beach, FL 32960

ELECTED AND APPOINTED OFFICIALS

Sal.	Name	Title	Organization Name
FEDERAL ELECTED OFFICAILS			
The Honorable	Marco Rubio	US Senator	United States Senate
The Honorable	Bill Nelson	US Senator	United States Senate
The Honorable	Curt Clawson	US Congressman, Florida District 19	United States Congress
The Honorable	Mario Diaz-Balart	US Congressman, Florida District 25	United States Congress
The Honorable	Carlos Curbelo	US Congressman, Florida District 26	United States Congress
STATE ELECTED OFFICIALS			
The Honorable	Vern Buchanan	Florida State Representative, District 16	The Florida Senate
The Honorable	Tom Rooney	Florida State Representative, District 17	The Florida Senate
The Honorable	Matt Hudson	Florida State Representative, District 80	The Florida Senate
The Honorable	Carlos Trujillo	Florida State Representative, District 105	The Florida Senate
The Honorable	Kathleen Passidomo	Florida State Representative, District 106	The Florida Senate
The Honorable	Dwight Bullard	Florida State Senate, District 39	
COLLIER COUNTY OFFICALS			
The Honorable	Donna Fiaia	County Commissioner, District 1, Vice Chair	Collier County BOCC
The Honorable	Georgia A. Hiller, Esq.	County Commissioner, District 2	Collier County BOCC
The Honorable	Tom Henning	County Commissioner, District 3	Collier County BOCC
The Honorable	Penny Taylor	County Commissioner, District 4	Collier County BOCC
The Honorable	Tim Nance	County Commissioner, District 5, Chair	Collier County BOCC
Mr.	Leo E. Ochs, Jr.	County Manager	Collier County
Sheriff	Kevin J. Rambosk	Sheriff	Collier County Sheriff's Department
Mr.	Abe Skinner, CFA	Collier County Property Appraiser	Collier County
Mr.	Larry H. Ray	Tax Collector	Collier County
Dr.	Kamela Patton	Superintendent	Collier County District School Board
The Honorable	The Honorable Jennifer J. Edwards	Supervisor of Elections	Collier County
LEE COUNTY OFFICIALS			
The Honorable	John Manning	County Commissioner, District 1, Vice Chair	Lee County BOCC
The Honorable	Cecil Pendergrass	County Commissioner, District 2	Lee County BOCC
The Honorable	Larry Kiker	County Commissioner, District 3	Lee County BOCC
The Honorable	Brian Hamman	County Commissioner, District 4	Lee County BOCC
The Honorable	Frank Mann	County Commissioner, District 5	Lee County BOCC
Mr.	Roger Desjarlais	County Manager	Lee County
Sheriff	Mike Scott	Sheriff	Lee County Sheriff's Department
Mr.	Kenneth M. Wilkinson, C.F.A	Lee County Property Appraiser	Lee County
Mr.	Larry D. Hart	Tax Collector	Lee County
Mr.	Gregory Adkins, Ed.D.	Superintendent	Lee County District School Board
The Honorable	Sharon Harrington	Supervisor of Elections	Lee County
HENDRY COUNTY OFFICIALS			
The Honorable	Janet B. Taylor	County Commissioner, District 1	Hendry County BOCC
The Honorable	Darrell Harris	County Commissioner, District 2	Hendry County BOCC
The Honorable	Don Davis	County Commissioner, District 3	Hendry County BOCC

Eastern Collier MSHCP EIS, Mailing List

The Honorable	Michael Swindle	County Commissioner, District 4	Hendry County BOCC
The Honorable	Karson Turner	County Commissioner, District 5	Hendry County BOCC
Mr.	Charles T. Chapman IV	County Administrator	Hendry County
Sheriff	Steve Whidden	Sheriff	Hendry County Sheriff's Department
Mr.	Phillip L. Pelletier	Hendry County Property Appraiser	Hendry County
Mr.	Patrick B. Langford	Tax Collector	Hendry County
Mr.	Paul K. Puletti	Superintendent	Hendry County District School Board
Ms.	Brenda Hoots	Supervisor of Elections	Hendry County

Eastern Collier MSHCP EIS, Mailing List

Address 1	Address 2	City	State	Zip
	3299 Tamiami Trail East, Suite 106	Naples	FL	34112
Justice Center Annex Building	200 Main Street, Suite 801	Ft. Myers	FL	33901
	3299 Tamiami Trail East, Suite 105	Naples	FL	34112
	4715 Golden Gate Parkway, Suite 1	Naples	FL	34116
	404 West Palm Dr	Florida City	FL	33034
	2105 Rayburn HOB	Washington	DC	20515
	2160 Rayburn HOB	Washington	DC	20515
Collier County Administrative Building	3299 Tamiami Trail East, Suite 212	Naples	FL	34112
Collier County Administrative Building	3299 Tamiami Trail East, Suite 305	Naples	FL	34112
Collier County Administrative Building	3299 Tamiami Trail East, Suite 304	Naples	FL	34112
	10720 Caribbean Blvd., Suite 35	Cutler Bay	FL	33189
	3299 Tamiami Trail East, Suite 303	Naples	FL	34112
	2335 Orange Blossom Drive	Naples	FL	34109
	3299 Tamiami Trail East, Suite 303	Naples	FL	34112
	3299 Tamiami Trail East, Suite 303	Naples	FL	34112
	3299 Tamiami Trail East, Suite 303	Naples	FL	34112
County Manager's Office	3299 Tamiami Trail East, Suite 202	Naples	FL	34112
Collier County Government Center, Bldg J	3319 East Tamiami Trail	Naples	FL	34112
Collier County Government Center	3285 East Tamiami Trail	Naples	FL	34112
Courthouse Building, C-1 Rm. 310	3291 Tamiami Trail East	Naples	FL	34112
Dr. Martin Luther King, Jr. Administrative Center	5775 Osceola Trail	Naples	FL	34109
Rev Dr Martin Luther King Jr Building	3295 Tamiami Trail East	Naples	FL	34112
Old Lee County Courthouse	2120 Main Street	Fort Myers	FL	33901
Old Lee County Courthouse	2120 Main Street	Fort Myers	FL	33901
Old Lee County Courthouse	2120 Main Street	Fort Myers	FL	33901
Old Lee County Courthouse	2120 Main Street	Fort Myers	FL	33901
Old Lee County Courthouse	2120 Main Street	Fort Myers	FL	33901
	P.O. Box 398	Fort Myers	FL	33902
	14750 Six Mile Cypress Pkwy	Fort Myers	FL	33912
	P.O. Box 1546	Fort Myers	FL	33902
	2480 Thompson St	Fort Myers	FL	33901
Lee County Public Education Center	2855 Colonial Blvd.	Fort Myers	FL	33966
	2480 Thompson St	Fort Myers	FL	33901
	PO Box 1760	LaBelle	FL	33975
	PO Box 1760	LaBelle	FL	33975
	PO Box 1760	LaBelle	FL	33975

	PO Box 1760	LaBelle	FL	33975
	PO Box 1760	LaBelle	FL	33975
	PO Box 2340	LaBelle	FL	33975
West District - Main Headquarters Office	101 S.Bridge Street	LaBelle	FL	33975
	PO Box 1840	LaBelle	FL	33975
	25 E Hickpochee Ave	LaBelle	FL	33975
	25 E Hickpochee Ave	LaBelle	FL	33975
	25 E Hickpochee Ave	LaBelle	FL	33975

From: Onorato, Dave
To: Mcdonald, Kenneth
Cc: Land, Darrell
Subject: RE: Transportation Impacts to Florida Panther
Date: Wednesday, April 27, 2016 4:07:21 PM
Attachments: Downsetal_Panther_Wildlife_Crossings 2013 TGIS.pdf
McClintock_et_al_Panther_RK_popest_JAppEcol2015.pdf

Ken:

I'm certainly happy to help any way I can. I've attached a few papers that may assist with some of your questions, although I'm not sure it gets at the impact of future road development within the primary zone, which as you mention, has the potential to impact the panther population. You may be thinking of a GIS Risk Layer I compiled for the McClintock paper. I know this was recently discussed by David and Darrell Land.

I've cc'd Darrell on this email as he is actually on the PRIT transportation subteam and may have some additional perspective to add. But, perhaps a call is in order at some point to see how we can assist you? Please let us know.

Regards

Dave

Dave Onorato- Associate Research Scientist
Florida Panther Project
Fish and Wildlife Research Institute
Florida Fish and Wildlife Conservation Commission
298 Sabal Palm Road, Naples, FL 34114 USA
239-417-6352 (voice)
239-417-6361 (fax)

Florida Panther Net

From: Mcdonald, Kenneth [mailto:kenneth_mcdonald@fws.gov]
Sent: Wednesday, April 27, 2016 10:11 AM
To: Onorato, Dave <Dave.Onorato@MyFWC.com>
Subject: Transportation Impacts to Florida Panther

Good morning Dave,

David Shindle indicated you're the go-to person when it comes to transportation impacts to Florida Panther. I'm currently reviewing the Eastern Collier Multiple-Species Habitat Conservation Plan and it's already clear to us the impact changes in transportation activity and infrastructure in the action area on Florida Panther, likely to be indirectly caused by potential residential and commercial development, are a significant concern we need to address while preparing an Environmental Impact Statement and subsequent Biological Opinion.

Could you briefly describe your work to-date and what you've found? We're hoping to project the number of panthers which could be impacted under different transportation development scenarios. Any assistance you can provide will be greatly appreciated!

Ken

--
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Energy and persistence will conquer all things

- Benjamin Franklin

Transactions in GIS

Research Article

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Strategically Locating Wildlife Crossing Structures for Florida Panthers Using Maximal Covering Approaches

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§Florida Fish and Wildlife Conservation Commission

Abstract

Crossing structures are an effective method for mitigating habitat fragmentation and reducing wildlife-vehicle collisions, although high construction costs limit the number that can be implemented in practice. Therefore, optimizing the placement of crossing structures in road networks is suggested as a strategic conservation planning method. This research explores two approaches for using the maximal covering location problem (MCLP) to determine optimal sites to install new wildlife crossing structures. The first approach is based on records of traffic mortality, while the second uses animal tracking data for the species of interest. The objective of the first is to cover the maximum number of collision sites, given a specified number of proposed structures to build, while the second covers as many animal tracking locations as possible under a similar scenario. These two approaches were used to locate potential wildlife crossing structures for endangered Florida panthers (*Puma concolor coryi*) in Collier, Lee, and Hendry Counties, Florida, a population whose survival is threatened by excessive traffic mortality. Historical traffic mortality records and an extensive radio-tracking dataset were used in the analyses. Although the two approaches largely select different sites for crossing structures, both models highlight key locations in the landscape where these structures can remedy traffic mortality and habitat fragmentation. These applications demonstrate how the MCLP can serve as a useful conservation planning tool when traffic mortality or animal tracking data are available to researchers.

1 Introduction

Forman (2000) estimated that up to 20% of wildlife habitat in the U.S. is impacted by close proximity to roads. While transportation right-of-ways do provide suitable habitat to some species (Forman and Alexander 1998), the presence of roadways and other transportation networks, such as railways, usually negatively impacts animal populations. The effects of transportation networks on wildlife are far-ranging and include: habitat loss from new construction, soil erosion and hydrological flow alteration as a result of increased impermeable surfaces (Reid and Dunne 1984), disturbance caused by noise (Arisz 2005, Reijnen et al. 1997), habitat fragmentation that can restrict movements and isolate populations (e.g. Bienen 2007, Cameron et al. 1995, Clark et al. 2001, de Maynadier and Hunter 2000, Shepard et al. 2008), and the occurrence of wildlife-vehicle collisions.

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Wildlife-vehicle collisions are a major human health and safety risk not only in the U.S. but across the globe (Bruinderink and Hazebroek 1996, Inbar et al. 2002, Dussault et al. 2006, Jones 2000, Orlowski and Nowak 2004, Ramp et al. 2006). Wildlife collisions are a concern, because they often cause injury or death to vehicle passengers (Bashore et al. 1985, Biggs et al. 2004, Iverson and Iverson 1999) and result in considerable property damage (Finder et al. 1999, Mastro et al. 2008). However, collisions can also be a significant source of mortality for wildlife. Collisions with moose, elk, deer, bear, and other large mammals are the best documented, perhaps due to the abundance, size, and damage potential of these species (Braden et al. 2008, Farrell and Tappe 2007, Garrett and Conway 1999, Hubbard et al. 2000, Waller and Servheen 2005). Mortality caused by collisions is also well documented for a variety of smaller species, including other mammals (Clevenger et al. 2003, Fehlberg and Pohlmeyer 1993, Ford and Fahrig 2007, Orlowski and Nowak 2006, Philcox et al. 1999), birds (Orlowski 2005, Orlowski and Siembieda 2005), reptils and amphibians (Carr and Fahrig 2001, Eigenbrod et al. 2008, Langen et al. 2007, Roe et al. 2006, Sillero 2008), and insects (Elzanowski et al. 2009, Rao and Girish 2007). Collision-caused mortality is a particular conservation concern for endangered animal populations that are already at risk of extinction (Cook and Daggett 1995, Ferreras et al. 1992).

As transportation networks impose a variety of ecological impacts on animal populations, and also pose risks to human health and safety, research has focused on developing strategies for reducing these conflicts. While preventative measures such as fencing, warning signs, and other deterrents have been shown to reduce collisions in some situations (Cramer et al. 2006, Knapp 2005, Putman 1997), wildlife crossing structures – which allow animals to safely pass over or under roads – are a preferred solution since they can mitigate habitat fragmentation in addition to reducing roadway mortality (Cramer and Bissonette 2005, Kintsch et al. 2006). Crossing structures are typically implemented in locations where there is a known habitat disconnect, or where hot-spots of collisions occur as determined from accident reports or road-kill surveys (Clevenger 2005, Krisp and Durot 2007). However, Clevenger (2005) noted that strategic planning and integration of crossing structures into transportation systems is generally lacking. Proper siting of crossing structures is essential, because their placement determines wildlife utilization (Ruediger 2001). Additionally, since high construction costs limit the number of structures that can be implemented in practice, strategic landscape planning efforts should aim to identify potential crossing structure locations that yield the greatest conservation benefits given limited expenditures.

Downs and Horner (2012) suggested that location modelling can offer one approach for strategically siting wildlife crossing structures. Facility location models developed in operations research are widely used in GIS to strategically site facilities and other types of infrastructure. While there are many variants (see Revelle et al. [2008] and Murray [2010] for reviews), facility location models are designed to select the best locations for new facilities from a set of candidate sites by mathematically optimizing an objective function that is subject to any distance or other constraints. In the context of crossing structures, Downs and Horner (2012) developed two sets of spatial models for locating these facilities with the objective of connecting discrete, isolated habitats that are fragmented by roads. The first set of models minimizes the number of crossing structures required to connect all habitat patches in a landscape. The second set maximizes inter-patch connectivity given a fixed number of structures to locate. While these approaches are useful when target species occupy small isolated patches, they are not applicable for landscapes with more continuously distributed habitat where roads divide relatively large tracts of land. As such, this article describes alternative spatial modelling approaches that are based on collision records and animal tracking data rather than habitat configurations.

Specifically, the maximal covering location problem (MCLP) (Church and ReVelle 1974) is proposed as a method to strategically site wildlife crossing structures. Two approaches are used. The objective of the first is to 'cover' the maximum number of observed collision sites given the locations of existing structures and a specified number of proposed new structures. The second utilizes animal tracking data, rather than collision records, and attempts to cover as many animal locations as possible under a similar scenario. The models are explored in the context of locating potential crossing sites for endangered Florida panthers in three counties of Southwestern Florida. The goal is to identify optimal locations for future panther crossing structures under a variety of planning scenarios. The remainder of the article is organized as follows. Section 2 outlines the maximal covering approach and describes how it can be used to site wildlife crossing structures in road networks. Section 3 applies the model to locate crossing structures for Florida panthers. Finally, Section 4 discusses the limitations and applicability of this approach in the context of both panther recovery and GIScience in general.

2 Maximal Covering Approach for Siting Wildlife Crossing Structures

The maximal covering location problem (MCLP) was originally described by Church and ReVelle (1974). The MCLP sites a specified number of facilities such that the selected facilities 'cover' as much demand as possible given each facility's potential service area. For example, the MCLP can be used to site hospitals such that they cover the largest amount of people within their service radii. The MCLP has been used to locate facilities in numerous urban and environmental planning situations. For example, this approach has been used to determine optimal locations for nature reserves (Church et al. 1996, Gerrard et al. 1997), health care facilities (Rahman and Smith 1995), ambulances and other emergency vehicles (Asiedu and Remsel 2009, Erdemir et al. 2010, Lim et al. 2011), businesses and many other types of public and private facilities (Chung 1986). The MCLP approach can be extended to site wildlife crossing structures in road networks based on patterns of either traffic mortality or observed animal locations. Herein, the goal was to select locations for crossing structures that cover the maximum number of either mortality or location data points.

The MCLP can be formulated as a linear integer programming problem using the following notation from Daskin (1995):

INPUTS: h_i = demand at location i
p = ff number of facilities to locate
a_{ij} = 1 if candidate facility j can cover demand at location i; 0 otherwise

MAXIMIZE:
$$\sum_i h_i Z_i \tag{1}$$

SUBJECT TO:
$$\sum_j a_{ij} X_j - Z_i \geq 0 \qquad \forall i \tag{2}$$

$$\sum_j X_j = p \tag{3}$$

X_j = 1 if facility j is selected; 0 otherwise $\forall i$ (4)

Z_i = 1 if demand at node i is covered; 0 otherwise $\forall i$ (5)

Here, the objective function (1) maximizes the amount of demand covered by selected facilities. Constraints (2) ensures that for every demand node i, the demand is only covered if a

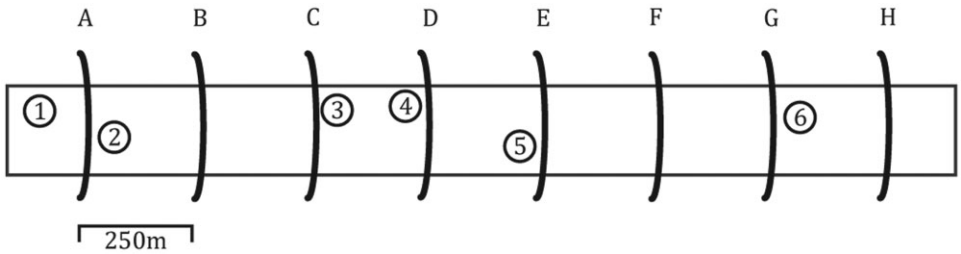

Figure 1 Sample roadway with wildlife traffic kills and potential crossing structure locations

facility capable of covering that demand is selected by the model. In other words, if all $a_{ij} = 0$ for node i are zero for the selected facilities, then the decision variable z_i is forced to also equal zero and not contribute to the objective function. In practice, values for a_{ij} are determined based on the proximity of the demand locations to the candidate facilities. Proximity can be measured in any number of ways, such as Euclidean or network distances. Constraint (3) specifies the p number of facilities the user wishes to locate. Finally, binary integer bounds (integrality conditions) are specified for decision variables X_j (4) and Z_i (5).

Figure 1 illustrates the first approach for siting wildlife crossing structures using a simple example with six collision sites along a road network. Here, each collision location is considered a demand point. For all points, the demand is equal to 1, since each represents mortality for a single animal. Then, potential crossing structure locations are identified along the roadway. In this case, candidate sites are arbitrarily defined every 250 m along the road and labeled A through H. If each crossing structure can cover a 250 m distance of roadway in either direction, then the MCLP for $p = 1$ can be written as shown in Table 1. This table displays the list of equations as coded in standard linear programming (lp) format, including the objective function (MAXIMIZE), constraints (SUBJECT TO), and bounds (BINARIES). Once the equations are written in that manner, the problem can be solved using optimization software. These 'solvers' use various search algorithms to find the optimal solutions. The sample problem from Figure 1 was solved using the commercial optimization package ILOG C-PLEX (IBM Corp). The output yields the values for the objective function and the decision variables, X_j and Z_i. In this scenario, the problem yields an objective value of 3, where $X_D = 1$, $Z_3 = 1$, $Z_4 = 1$, and $Z_5 = 1$, with all other decision variables equal to zero. In other words, candidate location D is selected as the single crossing structure, and it covers three collision sites – numbers 3, 4, and 5. This solution is intuitive, since location D is the only candidate site capable of covering three collisions and therefore provides the maximal amount of coverage. In the scenario of locating two crossing structures, then, candidate locations D and A are selected. They cover five collision sites in total, numbers 1 through 5. Finally, if a third crossing structure is added – either G or H – then all crossing sites are covered for an objective value of 6. Adding additional crossing structures would not increase the value of the objective, since all six collision sites are already covered.

Similarly, Figure 2 illustrates the second scenario where the goal is to site crossing structures such that they cover as many animal tracking data points as possible. This example uses the same road network and potential crossing structure locations as Figure 1, although here 35 tracking data points represent possible demand locations. If we assume a 1,000 m coverage distance (represented as dotted circles), then 22 of the 35 points are in need of coverage. Note that coverage distances are expressed using Euclidean, or straight-line, distances in this scenario. While in the first example distances between potential structures and collisions were measured according to lengths along the roadway (i.e. network distances), Euclidean distances

Table 1 Formulation of the MCLP for the scenario depicted in Figure 1

```
MAXIMIZE
lz_l + lz_2 + lz_3 + lZ_4 + lz_5 + lz_6

SUBJECT TO
lX_A + OX_B + OX_C + Ox_D + OX_E + OX_F + OX_G + OX_H - z_l >= 0
lX_A + lX_B + OX_C + Ox_D + OX_E + OX_F + OX_G + OX_H - z_2 >= 0
OX_A + OX_B + lx_C + lX_D + OX_E + OX_F + OX_G + OX_H - z_3 >= 0
OX_A + OX_B + lx_C + lX_D + OX_E + OX_F + OX_G + OX_H - z_4 >= 0
OX_A + OX_B + OX_C + lX_D +lX_E + OX_F + OX_G + OX_H - z_5 >= 0
OX_A + OX_B + OX_C + OX_D + OX_E + OX_F + lX_G + lX_H - z_6 >= 0

X_A + X_B + X_C + X_O + X_E + X_F + X_G + X_H =1

BINARIES
z_l
z_2
z_3
z_4
z_5
z_6

X_A
X_B
X_C
X_D
X_E
X_F
X_G
X_H

END
```

are used in this case, since tracking data points occur both on and off roads. In this case, coverage is specified according to the maximum distance that each crossing structure is expected to attract usage by wildlife. For example, solving the MCLP for $p = 1$ crossing structure yields an objective value of 12 where structure D is selected for construction; twelve tracking points occur within a 1,000 m radius of D, more than for any other candidate structure. If two structures are sited, then locations D and G are selected and cover a combined 18 tracking points. Three sites (D, G, and B) can cover 21 tracking points, while four (D, G, B, and F) can cover all 22. Similar to the first scenario, adding additional crossing structures would not increase the value of the objective, since all coverable tracking points are already served by four structures. The next section explores both of these approaches in the context of siting crossing structures for Florida panthers.

3 Locating Crossing Structures for Florida Panthers

The Florida panther (*Puma concolor coryi*) inhabits forest, wetland, and grassland habitats in southwestern Florida (Benson et al. 2008, Comiskey et al. 2002, Cox et al. 2006, Onorato

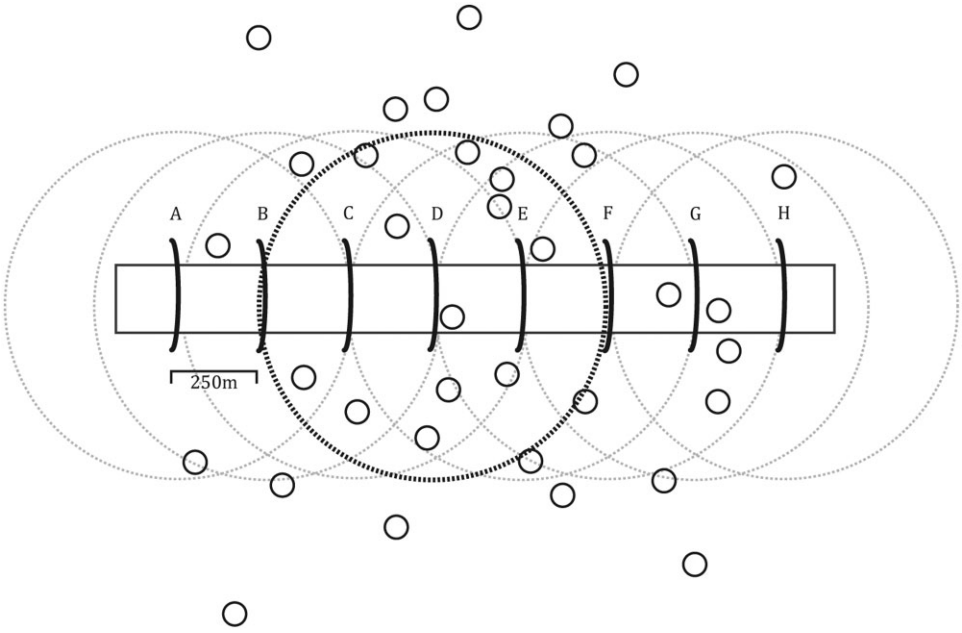

Figure 2 Sample roadway with wildlife tracking data and potential crossing structure locations

et al. 2011). This federally endangered large carnivore (Federal Register 1967) persists in a single, isolated population of 100–160 individuals (FWC 2010). Florida panthers occupy large home ranges, often hundreds of square kilometers in size (Belden et al. 1988, Kautz et al. 2006, Land et al. 2008), and habitat fragmentation is a major conservation concern (Meegan and Maehr 2002, Onorato et al. 2010). Since individuals can travel large distances in a diel period, roads pose a major threat to the population (Janis and Clark 2002, Schwab and Zandbergen 2011), and vehicle collisions have been documented as a significant source of panther mortality (Buergelt et al. 2002, Onorato et al. 2010, Taylor et al. 2002). Wildlife crossing structures have been implemented on some major roadways in an attempt to reduce traffic mortality and improve habitat connectivity within the panther's breeding range. Use of these structures by Florida panthers is well documented and studies have demonstrated reductions in traffic mortality rates after installation (Foster and Humphrey 1995, Jansen et al. 2010, Lotz et al. 1997). Although crossing structures have proven beneficial to the Florida panther, they are expensive to implement – on average $4 million plus $85/m of fencing according to 2008 pricing (Onorato et al. 2010) – and construction has been limited to a narrow region of southwestern Florida. Therefore, if only a limited number of crossing structures can be built in the future, it will be important to delineate candidate locations that can provide the greatest conservation benefit.

3.1 Study Area and Data

Three counties in southwestern Florida that comprise the largest portion of the Florida panther's current breeding range were included in the study: Lee, Hendry, and Collier (Figure 3). This area includes a large proportion of protected land, including the 107 km^2

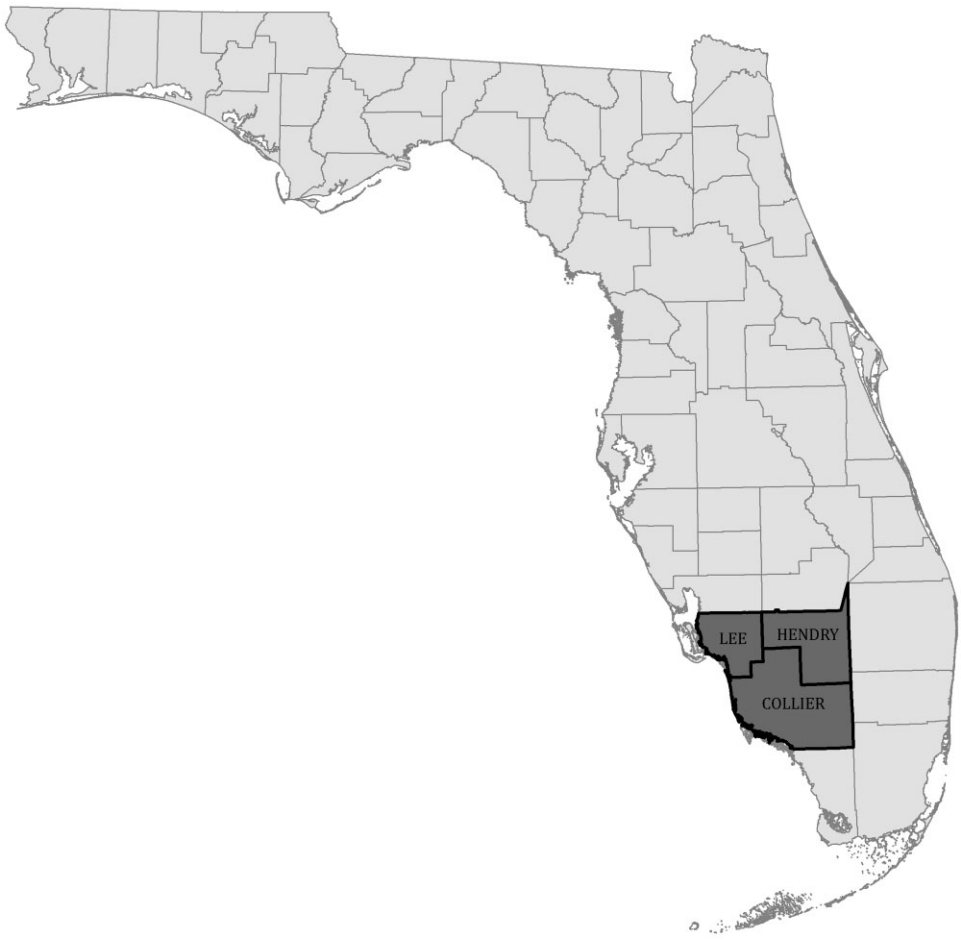

Figure 3 Location of Lee, Collier, and Hendry Counties in Florida

Florida Panther National Wildlife Refuge, 2,950 km^2 Big Cypress National Preserve, and portions of Everglades National Park. Spatial data layers documenting the locations of county boundaries, major roads, and existing wildlife crossing structures and associated lengths of fencing (updated as of 2010) were obtained from the Florida Geographic Data Library (FGDL) (http://www.fgdl.org). Panther-vehicle collision data from 1979–2010 were obtained from a detailed database of panther mortality maintained by the Florida Fish and Wildlife Conservation Commission (FWC). This updated dataset was previously analyzed by Buergelt et al. (2002) and Taylor et al. (2002) and is also archived by FGDL. Figure 4 illustrates the locations of the collisions with respect to major roads and the existing wildlife crossing structures in the three-county area. Approximately 86% (132 of 153) of the state-wide collisions occurred within the study area. Forty-six crossings have been built in this area to reduce panther mortality. They are primarily found along Interstate Highway 75 and State Road 29 in Collier County. Only five collisions are mapped within 250 m of a crossing structure, and all of these occurred during the 1980s on Interstate 75 before crossing structures were built.

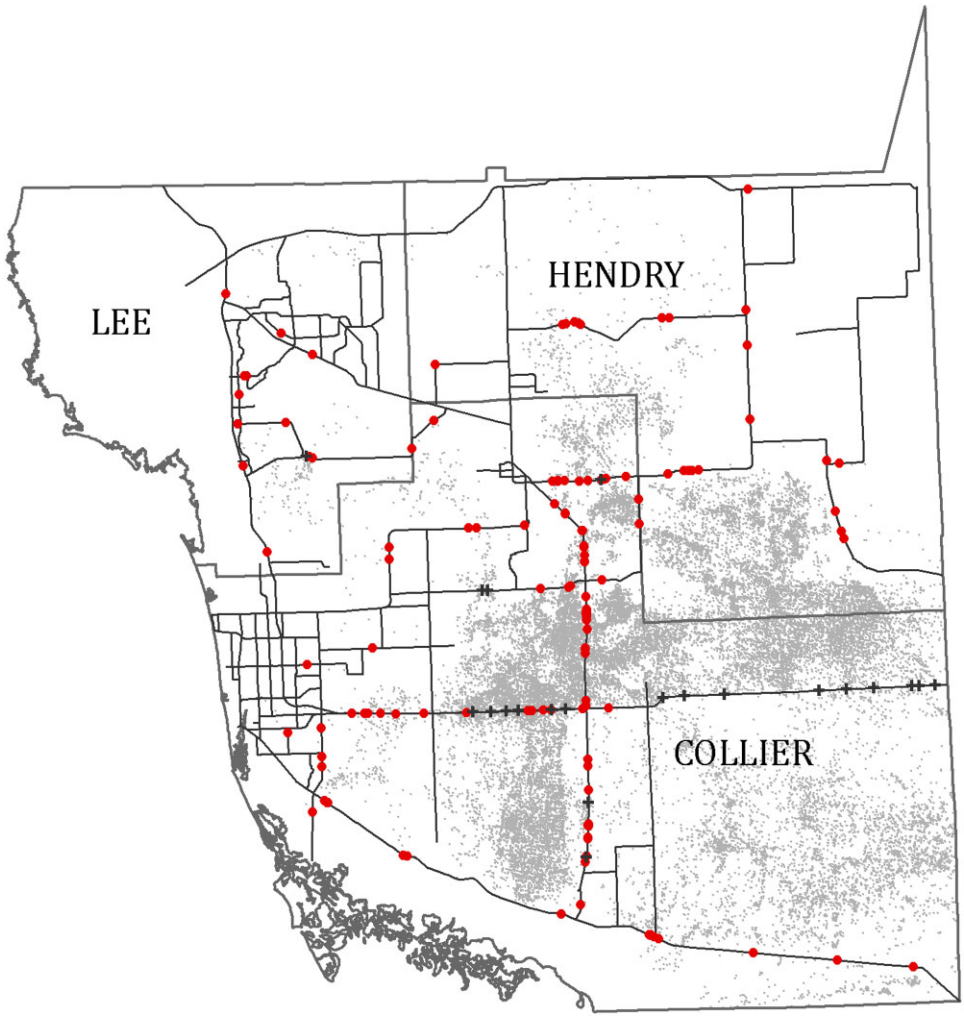

Figure 4 Locations of major roads, existing crossing structures (crosses), panther traffic kills (black circles), and radio-telemetry locations (grey dots) in the study area

While some crossings were placed near known panther traffic kills, most were placed at strategic points in the landscape (old logging trams, uplands, etc.) where panther movements between high quality habitats were previously documented or expected. A detailed description of the structures and their usage by panthers is provided by Foster and Humphrey (1995) and Jansen et al. (2010). A panther utilizing one of these structures is illustrated in Figure 5. Additionally, an extensive aerial VHF radio-tracking dataset was obtained from FWC, also illustrated in Figure 4. For the three study area counties, there are 41,644 locations for 94 unique panthers. Methods used to collect the data for each individual three times per week are detailed in Land et al. (2008), FWC (2010), and NPS (2009). We used the entire time spans of collision and tracking data in order to include areas that are both currently and historically important to the species.

Figure 5 A Florida panther utilizing a crossing structure

3.2 MCLP Applications

3.2.1 Collision-based approach

Since the majority of panther-vehicle collisions occurred in locations without crossing structures, future collisions might be prevented by constructing additional ones in problematic areas. The MCLP was used to find strategic locations for any new structures to be built within the three-county region. The MCLP for the collision-based approach was solved using seven different coverage distances: 500, 750, 1,000, 1,250, 1,500, 1,750, and 2,000 m. These distances can be assumed to represent the length of fencing – which prevents panthers from crossing – installed along the roadway on each side of the structure. For each coverage distance scenario, the model was solved for all values of p until all collisions were covered. First, candidate sites were identified along the major roads in the counties. This was accomplished by dividing the road network into segments approximately 0.15 km in length. The nodes, or endpoints, of these segments served as candidate locations. Then, locations of existing crossing structures were joined to the network layer so the coverage they provide (as determined from fencing lengths) could be included in the model. Next, network distances between each candidate or existing crossing structure (j) and each collision (i) were computed using a commercial GIS package, TransCAD v. 5.0 (Caliper Corp.). These measurements were used to determine the collisions each facility could cover based on the specified coverage distances (i.e. a_{ij} in Equation 2). These distance values were exported from the GIS as a text file. Then, a custom C++ script was written to read in the text file and output a new file with the MCLP for the

scenario in lp format. The lp file contained the equations described in Section 2, along with an additional set of constraints that required existing crossing structures to be included in the model result. These constraints were written by setting $X_j = 1$ for all j representing existing structures. Finally, the lp files were solved using ILOG C-PLEX, with the results imported back into GIS for visualization.

3.2.2 Tracking-based approach

Since a large proportion of the Florida panther population has been consistently tracked over the years, these data provide an opportunity to site crossing structures in areas known to be frequented by the panthers. Here, the MCLP was applied using the radio-tracking dataset previously described with the same road network and candidate locations as for the first scenario. The MCLP was solved using one coverage distance of 1,000 m for $p = 1$ to $p = 8$ facilities; these distances and numbers of facilities were selected for brevity and to make the results most comparable to the emphasized output from the first scenario. First, GIS was used to reduce the tracking dataset to include only locations within 1,000 m of a major road; this yielded 4,032 coverable demand points. Next, Euclidean distances between each candidate or existing crossing structure (j) and each tracking point (i) were computed using TransCAD GIS. Finally, the same processing, scripting, and solving procedures as for scenario one were used to obtain and map the results.

3.3 Results

3.3.1 Collision-based approach

The resulting objective values for the MCLP applications for siting Florida panther crossing structures are summarized in the trade-off curves in Figure 6 and recorded in Table 2. The value for $p = 0$, or no new structures, indicates the number of collisions covered by existing facilities. For example, if an effective coverage distance of 1,000 m is assumed, then existing structures only cover 15 collisions. The trade-off curves illustrate the total number of collisions that are covered with the construction of each additional structure. For instance, if the 1,000 m coverage distance scenario is explored, constructing one new facility can cover eight more collisions for a total of 23, while a second can cover an additional seven for a total of 30. By examining the curves, it is evident that the number of collisions covered by each added crossing structure diminishes as the collision sites become more spatially dispersed from one another. For example, in the same coverage scenario, the third and forth structures cover four collisions each. Once eight structures are built, only three collisions are covered by each new structure. By the time 11 and 24 structures are sited each serves only two or one, respectively. Similar trends are observed for the remaining coverage distances.

In addition to the number of collisions covered, the MCLP output includes the specific structures selected by the model. For example, Figure 7 maps the top eight crossing structure locations for the 1,000 m coverage distance scenario. The first structure (i.e. solution for $p = 1$) is located on State Route 29 (SR-29). It is located north of four existing crossing structures built on the same road segment in Collier County. The second is also located in Collier County but on US-41, a highway without any existing crossing structures. The third is located on County Road (CR)-846 in Hendry County. The fourth is sited on SR-29, between CR-846 and CR-858, a road segment which has no existing crossing structures. The fifth is also located on

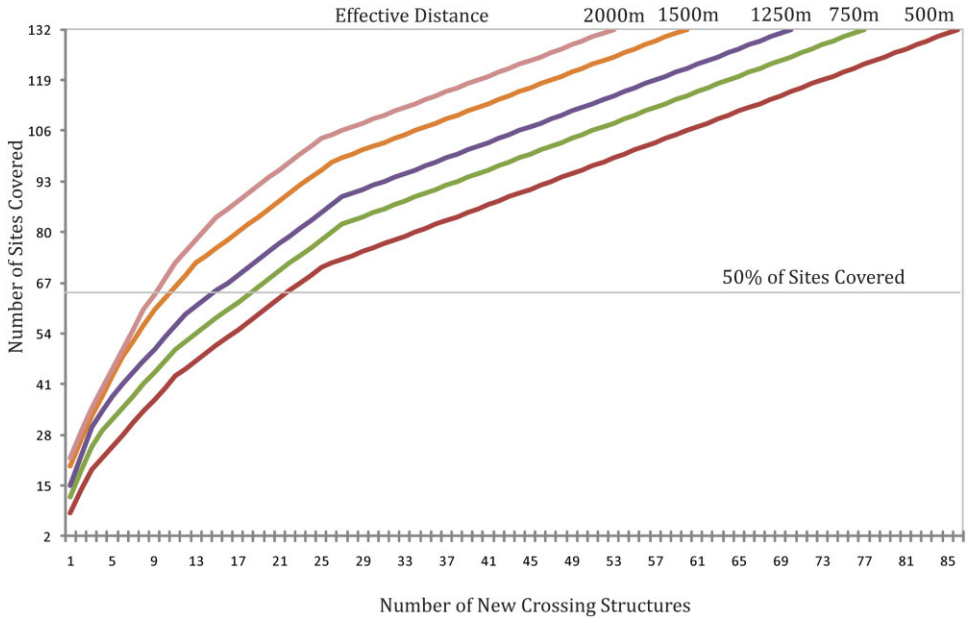

Figure 6 Trade-off curves for solutions of the MCLP for the collision-based approach

SR-29, along an unfenced portion of roadway between two existing structures. Remaining sites include Interstate 75 (I-75) and CR-846 in Collier County as well as CR-832 in Hendry County.

The curves can also serve as a reference guide in terms of the number of structures required to meet specific conservation goals for each coverage distance. For example, 69 structures are required to cover all collisions at the 1,000 m threshold. If coverage of 50% of the collisions is desired, then the appropriate number of covered collisions – 66 in this case – can be determined for each scenario; 22 additional crossings would be needed assuming a 500 m threshold, 15 for 1,000 m, 10 for 1,500 m, and nine for 2,000 m. Likewise, a threshold can be specified in terms of the minimum number of collisions a new structure must protect in order to be built. For example, if each crossing structure must cover at least four collisions to be considered worthwhile, then the number of crossing structures to implement in a study area can be determined. In this case, the ideal number of crossing structures selected for installation would be between two and nine, depending on the specified coverage distance. This type of strategy would be useful in situations where planners decide it is economically infeasible to build structures that do not provide a large enough conservation benefit.

3.3.2 Tracking-based approach

Solving the MCLP with the radio-tracking data as demand points identifies different locations for crossing structures than the collision-based approach when using a similar distance of 1,000 m for up to eight new facilities (Figure 8). Existing crossing structures protect nearly half of the telemetry data near roadways (2,008 of 4,032 points), indicating they are well-placed with respect to known panther movements. The addition of one new structure – located in an unfenced area between two structures on SR-29 – can cover 131 points (from 19 unique

Table 2 Number of panther mortality sites covered by p number of crossing structures using coverage distances of 500 to 2,000 m

p	500 m	750 m	1000 m	1250 m	1500 m	1750 m	2000 m	*p*	500 m	750 m	1000 m	1250 m	1500 m	1750 m	2000 m
0	8	12	15	17	20	20	22	43	90	99	106	114	116	119	123
1	14	19	23	25	27	27	29	44	91	100	107	115	117	120	124
2	19	25	30	32	33	34	35	45	92	101	108	116	118	121	125
3	22	29	34	37	38	39	40	46	93	102	109	117	119	122	126
4	25	32	38	42	43	44	45	47	94	103	110	118	120	123	127
5	28	35	41	47	48	49	50	48	95	104	111	119	121	124	128
6	31	38	44	51	52	54	55	49	96	105	112	120	122	125	129
7	34	41	47	55	56	58	60	50	97	106	113	121	123	126	130
8	37	44	50	59	60	62	64	51	98	107	114	122	124	127	131
9	40	47	53	62	63	66	68	52	99	108	115	123	125	128	132
10	13	50	56	65	66	69	72	53	100	109	116	124	126	129	
11	45	52	59	68	69	72	75	54	101	110	117	125	127	130	
12	47	54	61	71	72	75	78	55	102	111	118	126	128	131	
13	49	56	63	73	74	77	81	56	103	112	119	127	129	132	
14	51	58	65	75	76	79	84	57	104	113	120	128	130		
15	53	60	67	77	78	81	86	58	105	114	121	129	131		
16	55	62	69	79	80	83	88	59	106	115	122	130	132		
17	57	64	71	81	82	85	90	60	107	116	123	131			
18	59	66	73	83	84	87	92	61	108	117	124	132			
19	61	68	75	85	86	89	94	62	109	118	125				
20	63	70	77	87	88	91	96	63	110	119	126				
21	65	72	79	89	90	93	98	64	111	120	127				
22	67	74	81	91	92	95	100	65	112	121	128				
23	69	76	83	93	94	97	102	66	113	122	129				
24	71	78	85	95	96	99	104	67	114	123	130				
25	72	80	87	96	98	101	105	68	115	124	131				
26	73	82	89	97	99	102	106	69	116	125	132				
27	74	83	90	98	100	103	107	70	117	126					
28	75	84	91	99	101	104	108	71	118	127					
29	76	85	92	100	102	105	109	72	119	128					
30	77	86	93	101	103	106	110	73	120	129					
31	78	87	94	102	104	107	111	74	121	130					
32	79	88	95	103	105	108	112	75	122	131					
33	80	89	96	104	106	109	113	76	123	132					
34	81	90	97	105	107	110	114	77	124						
35	82	91	98	106	108	111	115	78	125						
36	83	92	99	107	109	112	116	79	126						
37	84	93	100	108	110	113	117	80	127						
38	85	94	101	109	111	114	118	81	128						
39	86	95	102	110	112	115	119	82	129						
40	87	96	103	111	113	116	120	83	130						
41	88	97	104	112	114	117	121	84	131						
42	89	98	105	113	115	118	122	85	132						

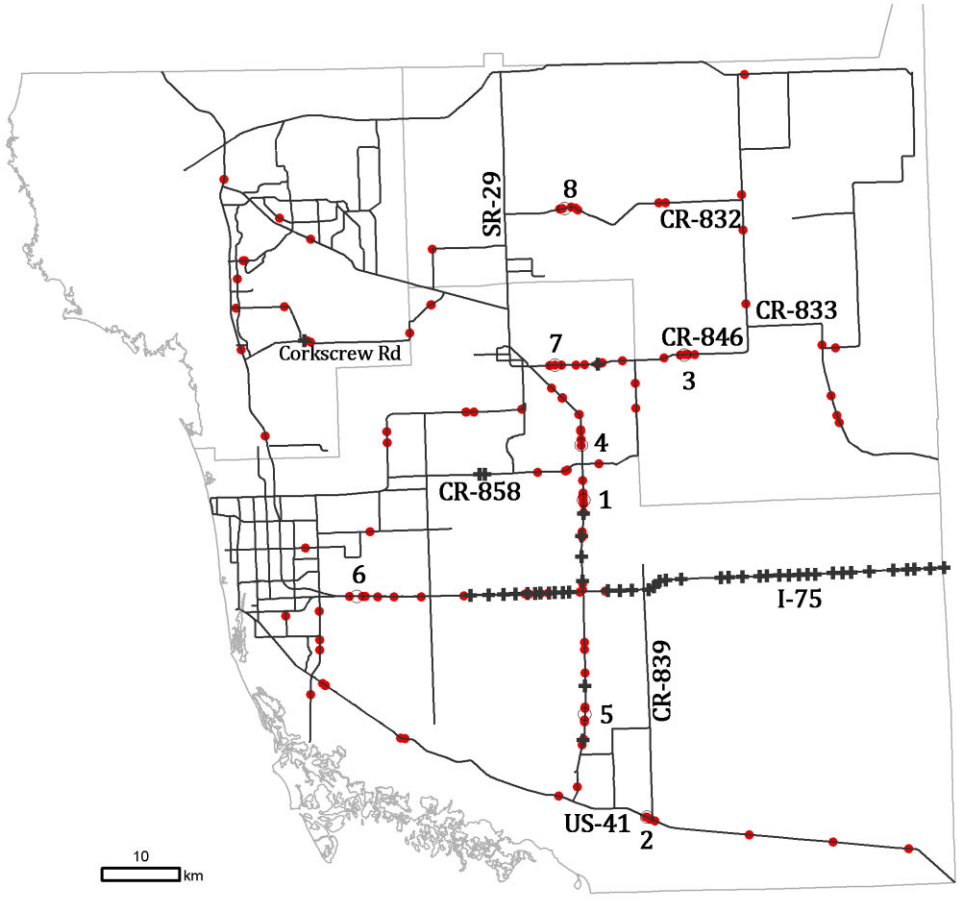

Figure 7 Top eight (numbered) selected crossing structure sites for the collision-based approach

panthers). The second structure, located on a segment of CR-858 that lacks crossing structures, can cover 127 (13). The third and fourth structures, covering 96 (19) and 78 (10) points, are also located in the unfenced area among existing structures on SR-29. The fourth, which was ranked first using the collision-based approach, is the only location selected by both models. The fifth and sixth protect 77 points each (10, 14) and are both located on CR-839. The seventh is located on I-75, just west of an existing crossing structure, and covers 51 (9) points. Finally, the eighth structure is sited on CR-858, 2 km west of the second selected site, and covers an additional 40 (8) points for a total of 2,762, or 69% of the coverable telemetry points.

4 Discussion and Conclusions

The results of this research illustrate how maximal covering approaches can be used to strategically site wildlife crossing structures based on spatial patterns of animal-vehicle collisions or

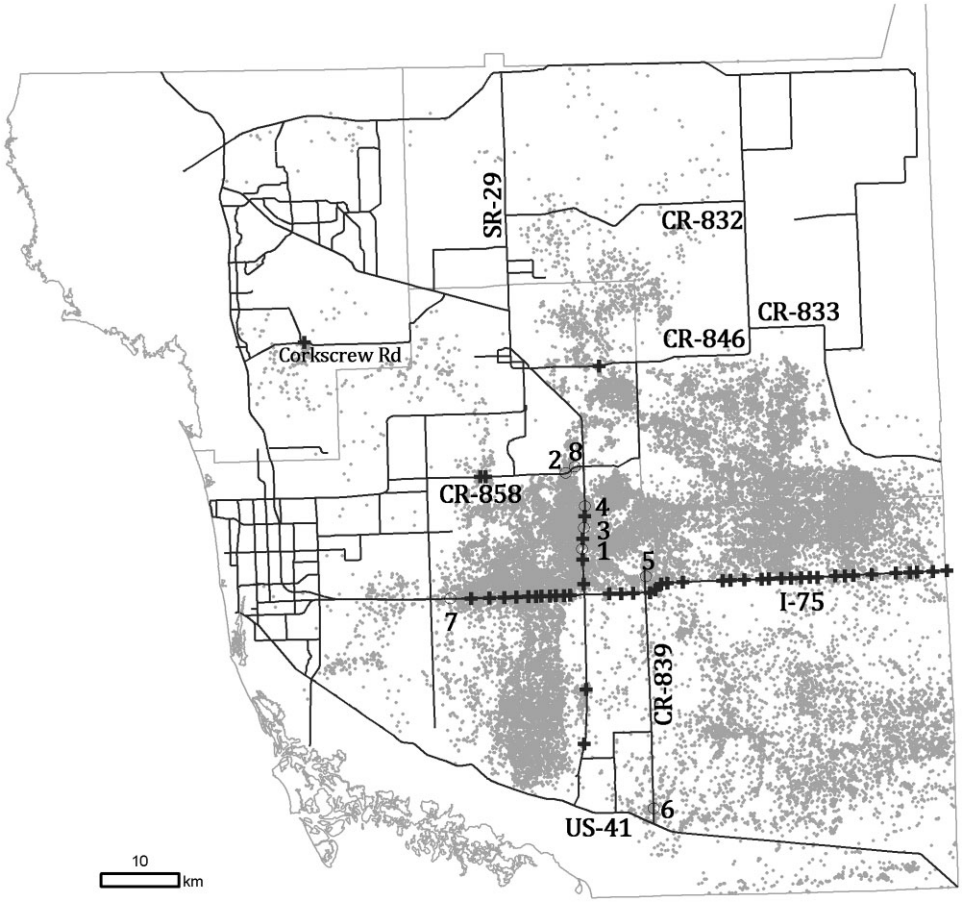

Figure 8 Top eight (numbered) selected crossing structure sites for the tracking-based approach

radio-tracking data. While other authors (e.g. Clevenger 2005, Krisp and Duret 2007) have proposed similar strategies based on mapping hotspots of traffic mortality (see Ramp et al. 2005, 2006), the main advantage of applying the MCLP is that the results explicitly identify the best locations for crossing structures – in rank order – as well as directly quantify the number of demand sites that can be protected by each additional structure under different coverage scenarios. Since funding to build new crossing structures is often difficult to encumber, the associated costs are most effectively incorporated into road building or widening projects during their initial planning stages as opposed to retrofitting crossings into existing roads (Onorato et al. 2010). Knowing the locations of priority crossing sites in advance of road construction projects invariably improves the likelihood that wildlife and funding issues will be assessed, and the maximal covering approaches described in this article can be used to identify location in early planning stages.

In the context of endangered Florida panthers, these maximal covering approaches identified a number of sites for placing new crossing structures given the locations of ones already installed within the study area. While these results can be used to develop a strategy for siting future crossing structures in Florida, there are a number of important issues – from both GIS

and ecological perspectives – that need to be considered before any site selections are finalized. First, and perhaps most importantly, the output is directly dependent on the quantity and quality of information used in the analysis, and the results must be evaluated or ground-truthed by experts familiar with the sites before any construction is recommended. In this case study, the inputs included publicly available GIS layers representing major roads, existing crossing structures with associated fencing, traffic mortality locations, and panther tracking data. While this information was sufficient to apply the MCLP to generate two ranked lists of priority crossing structure locations, there are other factors that might assist with planning decisions. Examples might include the monetary or environmental costs influenced by topography, road properties, habitat or soil conditions. For example, constructing a structure on a major interstate – like I-75 – would entail larger costs and more logistical issues than one constructed on a county road. Although the coverage models could be weighted according to these or other factors (see Amaldi et al. 2008, Farhan and Murray 2006, Oxendine et al. 2012), other site-specific factors are also relevant and can ultimately determine the success of a wildlife crossing project. As such, the following paragraph provides an on-the-ground assessment of the sites selected to identify any practical considerations before any model results are used to make planning recommendations for Florida panther conservation.

The proposed structure on SR-29 ranked first based on collisions and fourth based on tracking data, suggesting it as the highest priority site overall. An assessment of on-the-ground conditions finds that fencing stops almost abruptly at the existing crossing structure approximately 2 km to the south. Since this northern stretch of roadway is currently unprotected, it is an ideal place for an additional crossing structure, as it is located in prime panther habitat and has been a site of repeated collisions. However, the first and third priority sites according to the tracking model – located between existing structures immediately south of the area just discussed – are less of a priority than their ranks suggest. In particular, there is a canal on one side of the road and intermittent fencing recently installed on the other side, and these in combination provide a current barrier to panther movements. Much of this fencing was not included in the GIS database, as it is not directly connected to the existing crossing structures. Another issue presented by the two sites on CR-839, ranked fifth and sixth by the tracking-based approach, is that while this road is included in the data layer for major roads, in reality it is a dirt road that receives very little traffic; as such, it is not in need of urgent protection. However, of note is that the latter of these sites is in very close proximity to the site on US-41 that the collision-based model identified as rank two. This adds further support to the US-41 location, which already has been discussed as a candidate site by conservationists in Florida. Our on-the-ground assessment of this and the remaining sites selected by the models suggests they are viable candidates for future crossing installations. In particular, the tracking-based model suggests a problematic area on CR-858, where it selected the second and eighth ranked sites. In practice, one crossing structure with extended fencing might be adequate to protect this segment of road, which also experienced two collisions, and our results suggest it is a high priority location. Other important sites include two on CR-846, two on SR-29, two on I-75, and one on CR-832. Interestingly, a least cost pathway analysis (Lundqvist 2007) based on habitat configurations predicted that movements of Florida panthers are likely to intersect SR-29, CR-846, I-75, CR-832, and US-41 (Swanson et al. 2008), further supporting the recommendation for crossing structure installation at these locations.

Beyond the site-specific issues, there are a number of other issues worthy of discussion. First, in the application for Florida panthers, the MCLP was solved using a range of plausible coverage distances, ranging from 500 m to 2 km representing fence lengths, without concluding which value was most appropriate. Wildlife usage of structures increases when fences are

incorporated into projects, as they can prevent wildlife from traversing the roads on either side (Mata et al. 2005) of the wildlife crossing. Knowing the length of fencing necessary to maximize the benefits of a wildlife crossing can improve planning strategies. Spacing of neighbouring panther crossings within the study area is somewhat variable, ranging from approximately 750 m to 8 km. The lengths of fencing associated with these structures are also variable and include a 64 km section of I-75 with continuous fencing at one extreme. In our case study, we focused our discussion for the 1,000 m fencing scenario, since it represents about the average fence length for existing structures. Determination of fencing lengths is critical to the success of a crossing structure project, as there are both economic and ecologic trade-offs associated with the decision. From a purely economic perspective, constructing fewer crossing structures with longer lengths of fencing would be advantageous to constructing a greater number of structures with shorter fences, as the structures are more costly to implement. However, from an ecological perspective, fencing can be both beneficial to wildlife – by funneling their movements towards safe passage across roads – and detrimental to their movements by acting as a physical barrier if the lengths are too long. Ideally, crossing structures should have associated fencing that facilitates movements of target and non-target species through the crossing structure but without over-restricting their movements.

In terms of spatial analysis, there are concerns related to the measurement of distances between the demand points and the candidate crossing structures. The collision-based application utilized network distances computed using actual lengths of the road segments instead of straight-line distances, since the demand points are always located on-network, while the telemetry-based approach utilizes Euclidean distances, as the points mostly occur off-network. However, in both cases the MCLP can possibly produce misleading results if the distance measurements are not used carefully. If the coverage distance specified is relatively too large for a given road network structure, then it is possible that collisions on different roads (or telemetry locations separated by multiple roads) can be considered covered by a single structure. This can create a situation where an animal at one location must actually cross a road to utilize a crossing structure located on an adjacent road, although the model output considers it covered since it is within the specified coverage distance (Figure 9). This can be problematic if the construction of the crossing structure increases movements on an unprotected road segment. However, this was not a concern in this research as collisions and telemetry points tended not to be clustered around major intersections and appropriate coverage distances were specified. In situations where this artifact is problematic, a simple solution is to correct constraints in the model to ensure coverage is accurately represented. In this way, crossing structures can be modeled to cover only demand points on the same segment of road.

A third consideration is that some problem instances have multiple optimal solutions, especially in the case of the collision-based approach. In other words, for a given scenario, multiple crossing structures could be selected to achieve the same maximum objective, and the solver will output one randomly. For example, for the 1,000 m coverage distance, constructing a third, fourth, and fifth crossing structure each results in the protection of five additional collision sites. So, in terms of selecting the best site for the third structure, there are three possible locations – all of which contribute the same amount to the objective function. Therefore, if only a third structure is built, planners might want to further examine the three similar locations rather than choosing one randomly. For instance, the candidate location that is on average closest to the collisions, nearest telemetry data points, or nearest to the most recent collision might be prioritized.

In conclusion, the MCLP described in this article provides a useful planning tool for strategically locating wildlife crossing structures in road networks. Crossing structures reduce the

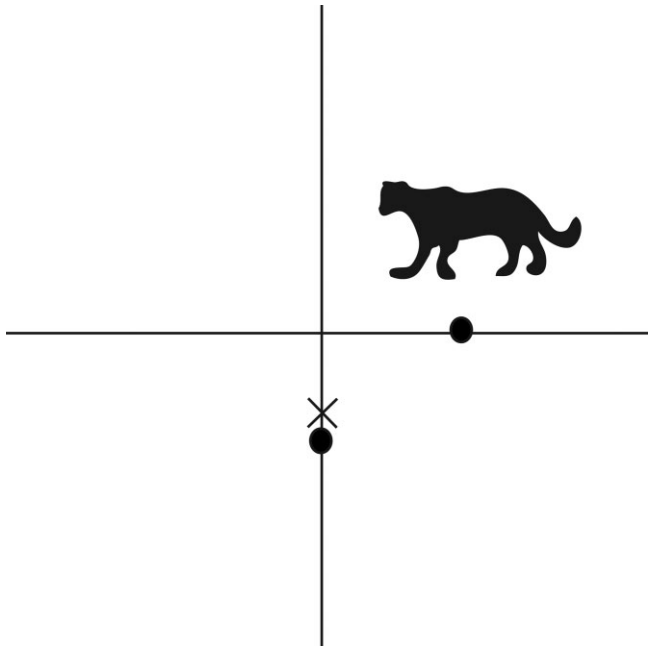

Figure 9 Coverage scenarios for traffic mortality sites located on adjoining roads

harmful, fragmenting effects of roads by enhancing habitat connectivity, which facilitates animal movements and reduces traffic mortality. The advantage of using the MCLP is that its output allows planners to objectively choose the best locations for new crossing structures as well as to quantify the benefits of building each successive facility. This strategy can be used to help prioritize funds such that the greatest conservation gains can be made with limited resources.

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Endangered Florida panther population size determined from public reports of motor vehicle collision mortalities

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Summary

1. Reliably estimating the abundance of rare or elusive animals is notoriously difficult. An archetypical example is the endangered Florida panther, whose conservation status is intrinsically linked to population size, but for which reliable abundance information is lacking across its range. This is due not only to the inherent difficulty of sampling a rare and elusive species over a large geographic area, but also because of restricted scientific access to private land.

2. Human interactions with wildlife are a regular occurrence, and interactions with non-scientists constitute an important and underutilized source of information about species distribution and abundance. For example, motor vehicle collisions with Florida panthers are recurrent on the vast network of roads within the public and private lands comprising its range in southern Florida, USA.

3. Capitalizing on a tendency for the public to report collisions with species of concern to wildlife officials, we describe a novel methodology using public reports along with routine telemetry monitoring data to produce the first statistically defensible population estimates for the Florida panther across its entire breeding range. In essence, our approach uses traffic volume and road density to estimate the probability of motor vehicle collision mortality from telemetered animals and models counts reported by the public accordingly.

4. Despite low motor vehicle collision mortality probabilities, our methodology achieved abundance estimates of reasonable precision (29% CV) that was similar to that of previous panther studies using conventional approaches on much smaller study areas. While recovery criteria require establishment of three distinct populations of 240 Florida panthers, we found this single population may never have exceeded 150 individuals from 2000 to 2012.

5. *Synthesis and applications*. By extracting critical demographic information from underutilized aspects of human–wildlife ecology, our citizen-based approach can cost less than conventional alternatives and could conceivably be used for long-term population monitoring of other species over broad geographic areas, for example from reports of avian wind farm collisions, beached whales or marine mammal boat strikes. An additional benefit is that it can be applied to historical data sets of carcass recovery programmes, in our case permitting abundance estimation over a 13-year period.

Key-words: abundance, capture–recapture, citizen science, dead recovery, human–wildlife ecology, imperfect detection, mark–resight, *Puma concolor coryi*, risk of collision, telemetry

Introduction

The estimation of population size for wild animals is essential to responsible management and testing ecological or evolutionary theory. Over the past four decades, a

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large variety of statistical methods have been developed for estimating the abundance of diverse taxa when detection probabilities are <1, including capture–recapture and distance sampling methods (e.g. Williams, Nichols & Conroy 2002). Invariably, there are cases where these now-traditional methods are challenged by ethological (e.g. reclusive or elusive behaviour), demographic (e.g. rare or low density), geographic (e.g. remote or large study areas), morphological (e.g. absence of individually identifiable traits) and various other aspects of the natural history of an animal. This is typically the case for large carnivores and most threatened or endangered species, but because management objectives are often centred on viable population sizes, statistically defensible abundance estimates remain critical to conservation and recovery programmes.

There has been some success with deriving population estimates for rare and elusive wildlife populations using capture–recapture methods, including both traditional and spatial approaches (Williams, Nichols & Conroy 2002; Royle *et al.* 2009). For example, DNA sampling from hair snares has been effective for brown bears (Kendall *et al.* 2008), while trail cameras have worked for felids with uniquely identifiable fur coloration patterns (Royle *et al.* 2009). However, these methods can be prohibitively expensive and field intensive for abundance estimation across a large geographic range. Furthermore, for species that are difficult to sample using hair snares or species lacking individually identifiable characteristics (e.g. spots or stripes), these techniques cannot be reliably used to estimate population size. One such animal is the endangered Florida panther (*Puma concolor coryi*).

The Florida panther is the only puma subspecies remaining in eastern North America and has been listed as endangered under the US Endangered Species Act for over 40 years (USFWS 2008). Although a species of concern whose conservation status is intrinsically linked to population size, reliable information about Florida panther abundance is lacking across its core reproductive range in southern Florida, USA. Since 1981, Florida panther movement and survival have been monitored using telemetry collars (Onorato *et al.* 2010). Such long-term monitoring provides valuable demographic data, but information about panther abundance has been largely limited to minimum numbers assumed alive (MNA) from counts based on physical evidence (McBride *et al.* 2008). While the MNA method has provided an index for panther managers to assess changes in the population, such indices provide no measures of uncertainty, do not account for variability in detectability or sampling effort and are clearly underestimates of the actual population size due to imperfect detection. Furthermore, researcher access to panther habitat in Florida is largely restricted to public lands. Of the 1·2 million ha that comprise the breeding range, 37% were under private ownership (Kautz *et al.* 2006). Thus, for the broader geographic range of the Florida panther, assessing abundance via either MNA or capture–recapture will invariably exclude extensive tracts of private lands that are inaccessible to panther biologists.

Despite efforts to reduce the impacts of anthropogenic disturbance associated with roadways intersecting private and public lands, collisions with motor vehicles remain the major source of documented mortality for the Florida panther (Onorato *et al.* 2010; see Fig. 1). To take advantage of this source of data that is already collected as part of routine monitoring, we propose a novel methodology that capitalizes on a tendency for the public to report motor vehicle collision mortalities (MVMs) to government agencies for prominent species of concern, such as the Florida panther, to estimate abundance at a much larger scale than is possible using conventional methods. Using a combination of data sources, including MVMs reported by the public and routine telemetry monitoring data, we produce the first statistically rigorous estimates for the population size of the Florida panther across its entire breeding range from 2000 to 2012. Our case study highlights one of many potential ways by which hitherto underutilized aspects of human–wildlife ecology can be exploited to produce defensible inferences about species distribution and abundance over broad geographic areas.

Materials and methods

Our approach shares some similarities with so-called mark–resight methods (White & Shenk 2001), where a telemetered (or marked) subset of the target population is used to estimate detection probability and adjust counts of unmarked individuals accordingly. However, the key distinctions to our approach are

Fig. 1. This 4·5-year-old male Florida panther was found along State Road 29 in Collier County, Florida, USA, on 1 July 2002. Wildlife officials determined the cause of death to be vehicle collision. Photo credit: David Shindle.

as follows: i) detection probability is not the probability of capturing or sighting a live individual, but rather the probability of a reported MVM; and ii) counts of unmarked individuals are obtained from MVMs reported to wildlife officials by the public. In the same spirit as dead recovery models of survival probability (Brownie *et al.* 1985) or carcass recovery models of mortality rate (Bellan *et al.* 2013), the statistical challenge lies in reliably estimating the probability of a reported MVM.

THE MVM MODEL

We assume the number of marked individuals alive in the study area is known during the period of interest for abundance estimation. Such 'known-fate' data typically rely on capture events where marked individuals are fitted with transmitters that allow the location and survival of each individual to be closely monitored (Williams, Nichols & Conroy 2002). We divide the study period into S seasons, each consisting of T_s ($s = 1,\ldots,S$) distinct sampling periods. For ease of exposition, we will initially assume the population is geographically and demographically closed within each season (with the exception of losses due to MVMs). If MVM public reporting rates are <100%, this does not pose a significant problem because the known fates of the marked individuals enable estimation of the probability of a reported MVM.

Assuming the marked population is representative of the unmarked population with respect to MVM and public reporting probability, we can modify the logit-normal mark–resight model likelihood (McClintock & Hoeting 2010; McClintock *et al.* 2013) to accommodate MVMs. Letting $y_{s,t,i} = 0$ indicate marked individual i was not a MVM during sampling period t of season s, $y_{s,t,i} = 1$ indicate marked individual i was a reported MVM, and $y_{s,t,i} = 2$ indicate marked individual i was determined by officials to be a MVM event, but this MVM was not independently reported to officials by the public, then

$$L(\boldsymbol{y},\boldsymbol{u}|\boldsymbol{\delta},\boldsymbol{r},\boldsymbol{U}) = \prod_{s=1}^{S}\prod_{t=1}^{T_s}\left[\prod_{i=1}^{M}\text{Categorical}(y_{s,t,i};\delta_{s,t,i},r_{s,t,i})\right] \times\text{Binomial}\left(u_{s,t};U_s-\sum_{k=1}^{t-1}u_{s,k},\bar{\delta}_{s,t}\bar{r}_{s,t}\right) \quad \text{eqn 1}$$

where

$$\text{Categorical}(y_{s,t,i};\delta_{s,t,i},r_{s,t,i}) = \begin{cases} 1-q_{s,t,i}\delta_{s,t,i} & \text{if } y_{s,t,i}=0 \\ q_{s,t,i}\delta_{s,t,i}r_{s,t,i} & \text{if } y_{s,t,i}=1 \\ q_{s,t,i}\delta_{s,t,i}(1-r_{s,t,i}) & \text{if } y_{s,t,i}=2, \end{cases}$$

$u_{s,t}$ is the number of reported MVMs for unmarked individuals, $q_{s,t,i} = 1$ is an indicator for whether individual i was alive and marked at the beginning of period t ($q_{s,t,i} = 0$ otherwise), M is the total number of unique individuals that were alive and marked at the beginning of at least one sampling period during the study, $\delta_{s,t,i}$ is the probability of MVM for marked individual i, $r_{s,t,i}$ is the probability of the public reporting a MVM for marked individual i, and U_s is the unmarked population size during season s. For a randomly selected individual from the population, we have $\bar{\delta}_{s,t} = E_i(\delta_{s,t,i})$ and $\bar{r}_{s,t} = E_i(r_{s,t,i})$. When $r_{s,t,i} = 1\ \forall\ i$, abundance at the end of each season is derived as $N_s = \sum_i q_{s,T_s,i} - \sum_i y_{s,T_s,i} + U_s - \sum_{t=1}^{T_s} u_{s,t}$. When $r_{s,t,i} < 1$ for any i, the model instead provides a derived estimate of abundance at the beginning of the season: $N_s = M_s + U_s$, where $M_s = \sum_i I(\sum_{t=1}^{T_s} q_{s,t,i} > 0)$ is the number of animals known to be alive and marked at the beginning of season s, and $I()$ is the indicator function.

Clearly, accurate estimation of MVMs and reporting probabilities from the marked population is critical to reliable estimation of abundance. This can be facilitated through the identification and collection of appropriate explanatory covariates for the MVM reporting process, such as temporal, environmental, behavioural or social factors. The logit link can be used to model $\delta_{s,t,i}$ or $r_{s,t,i}$ as a function of covariates, for example $\text{logit}(\delta_{s,t,i}) = \boldsymbol{x}'_{s,t}\boldsymbol{\beta} + \boldsymbol{z}'_{s,t,i}\boldsymbol{\alpha}$, where $\boldsymbol{x}_{s,t}$ is a vector of covariates common to all individuals during period t of season s, $\boldsymbol{z}_{s,t,i}$ is a vector of k individual-level covariates, and $\boldsymbol{\beta}$ and $\boldsymbol{\alpha}$ are corresponding vectors of regression coefficients. The expected MVM and reporting probability can then be calculated by the k-dimensional integral, for example $\bar{\delta}_{s,t} = \int_{\boldsymbol{z}} \text{logit}^{-1}(\boldsymbol{x}'_{s,t}\boldsymbol{\beta} + \boldsymbol{z}'\boldsymbol{\alpha})f(\boldsymbol{z})d\boldsymbol{z}$, where $f()$ is the joint probability density (or mass) function for the individual-level covariates.

In the absence of geographic and demographic closure (e.g. due to movement, recruitment or non-MVM mortality), our approach can be used to estimate the 'open' population size using the study area during the period of interest. This is accomplished by incorporating additional states based on the known fates and locations of the marked individuals. For example, suppose demographic closure is violated within seasons due to 'natural' (non-MVM) mortality. Although underutilized in wildlife studies, instantaneous rates are commonly used in fisheries science to model competing sources of mortality *sensu* the Baranov catch equation (Baranov 1918; Hoenig *et al.* 1998). If we let $y_{s,t,i} = 3$ indicate marked individual i was a natural mortality and assume instantaneous mortality rates are constant within sampling periods, we can modify eqn 1 to accommodate both MVM and natural mortality:

$$L(\boldsymbol{y},\boldsymbol{u}|\boldsymbol{D},\boldsymbol{r},\boldsymbol{P},\boldsymbol{U}) = \prod_{s=1}^{S}\prod_{t=1}^{T_s}\left[\prod_{i=1}^{M}\text{Categorical}(y_{s,t,i};D_{s,t,i},r_{s,t,i},P_{s,t,i})\right] \times\text{Binomial}\left(u_{s,t};U_s-\sum_{k=1}^{t-1}u_{s,k},\frac{\bar{D}_{s,t}\{1-\exp(-\bar{Z}_{s,t})\}\bar{r}_{s,t}}{\bar{Z}_{s,t}}\right) \quad \text{eqn 2}$$

where

$$\text{Categorial}(y_{s,t,i};D_{s,t,i},r_{s,t,i},P_{s,t,i}) = \begin{cases} q_{s,t,i}\exp(-Z_{s,t,i})+1-q_{s,t,i} & \text{if } y_{s,t,i}=0 \\ \dfrac{q_{s,t,i}D_{s,t,i}\{1-\exp(-Z_{s,t,i})\}r_{s,t,i}}{Z_{s,t,i}} & \text{if } y_{s,t,i}=1 \\ \dfrac{q_{s,t,i}D_{s,t,i}\{1-\exp(-Z_{s,t,i})\}(1-r_{s,t,i})}{Z_{s,t,i}} & \text{if } y_{s,t,i}=2 \\ \dfrac{q_{s,t,i}P_{s,t,i}\{1-\exp(-Z_{s,t,i})\}}{Z_{s,t,i}} & \text{if } y_{s,t,i}=3, \end{cases}$$

$D_{s,t,i}$ is the instantaneous MVM rate, $P_{s,t,i}$ is the instantaneous natural mortality rate, $Z_{s,t,i} = D_{s,t,i} + P_{s,t,i}$, $\bar{D}_{s,t} = E_i(D_{s,t,i})$, $\bar{P}_{s,t} = E_i(P_{s,t,i})$ and $\bar{Z}_{s,t} = E_i(D_{s,t,i} + P_{s,t,i}) = \bar{D}_{s,t} + \bar{P}_{s,t}$.

The population using the study area each season is then derived as $N_s = M_s + U_s$. The instantaneous mortality rates can be modelled as functions of covariates using the log link function: for example, $\log(D_{s,t,i}) = \boldsymbol{x}'_{s,t}\boldsymbol{\beta} + \boldsymbol{z}'_{s,t,i}\boldsymbol{\alpha}$ and $\bar{D}_{s,t} = \int_{\boldsymbol{z}} \exp(\boldsymbol{x}'_{s,t}\boldsymbol{\beta} + \boldsymbol{z}'\boldsymbol{\alpha})f(\boldsymbol{z})d\boldsymbol{z}$.

APPLICATION TO THE FLORIDA PANTHER

We used data collected within the breeding range of Florida panthers, which is restricted to <12 600 km^2 of available habitat in south Florida (Kautz *et al.* 2006; Land *et al.* 2008; Onorato *et al.* 2011). The study area is bordered by the Caloosahatchee River to the north, Florida Bay to the south and the urban areas of Miami-Fort Lauderdale and Naples-Fort Myers to the east and west, respectively (Fig. 2). While the breeding range of panthers within the interior of south Florida has a lower density of roads in comparison with the metropolitan areas along the coastline, there are still numerous state, county and local roads that panthers must cross with regularity. One major U.S. interstate highway (I75) transects the core of panther habitat by connecting Fort Lauderdale and Naples. A 40-mile stretch of this interstate that runs through prime panther habitat has been fitted with continuous high fencing and 36 underpasses specifically built or retrofitted for wildlife (Lotz, Land & Johnson 1997; Onorato *et al.* 2010). This has undoubtedly reduced the number of road mortalities that would have been expected to occur on this high-speed roadway. Despite these efforts, and the construction of wildlife underpasses for panthers in other areas of south Florida, MVM remains the major cause of mortality for panthers documented by agency personnel.

Based on known-fate data for marked panthers and public reports of MVMs for both marked and unmarked panthers, our goal is to estimate the adult and subadult (≥1 year old) male and female population sizes of the endangered Florida panther across its breeding range from 2000 to 2012. We relied on two sources of data collected by Florida Fish and Wildlife Conservation Commission (FWC) and National Park Service biologists. The first data source came from panthers that were captured and radiocollared with VHF transmitters (methods described elsewhere; Land *et al.* 2008; FWC 2013). Location data for the marked (i.e. radiocollared) panthers were collected during routine aerial monitoring flights three times per week (Land *et al.* 2008). Whenever a radiocollar emitted a mortality signal, researchers would quickly locate the carcass and determine the cause of death (e.g. intraspecific aggression, disease, MVM, unknown). Thus, the number of marked individuals alive in the study area was known during the entire study period. Of the many causes of panther mortality, MVM is arguably the easiest to identify based on characteristic traumatic injuries and the location of the carcass. We are therefore confident that mortalities identified as MVMs were not actually the result of an alternate cause of death and that unknown causes of death were not actually MVMs.

The second source of data was MVMs of both marked and unmarked panthers reported by the public to agency personnel from 2000 to 2012 (Fig. 3). Officials would dispatch to the site to confirm the validity of any report as soon as possible, and 94 unmarked MVMs were reported and confirmed within the study area. The vast majority of marked MVMs (13 individuals) were reported to agency personnel by the public. There were three exceptions where marked MVM carcasses were located through aerial telemetry and removed from the roadside by agency personnel prior to public reporting. Given the location of two of these carcasses when recovered, we believe these carcasses would have eventually been reported to agency personnel. One carcass of a marked MVM was located some distance from the roadway and would not have been found without the assistance of the radiocollar signal. Thus, for the purposes of this analysis, we treated 12 of the 13 marked MVM events as if they had been reported by the public.

MVM events occur year-round in the breeding range of the Florida panther. We divided our data into $S = 13$ seasons corresponding to the 2000–2012 calendar years. We further subdivided each season into 2-month sampling periods (hence $T_s = 6$ for $s = 1,\ldots,13$). Clearly, the population was not closed to recruitment, movement or non-MVM mortality within each season; this necessitated estimation of the population size using the breeding range each year as in eqn 2. However, because it does not explicitly account for movement or recruitment processes, we note that this 'open' model is an approximation (but see *Discussion*).

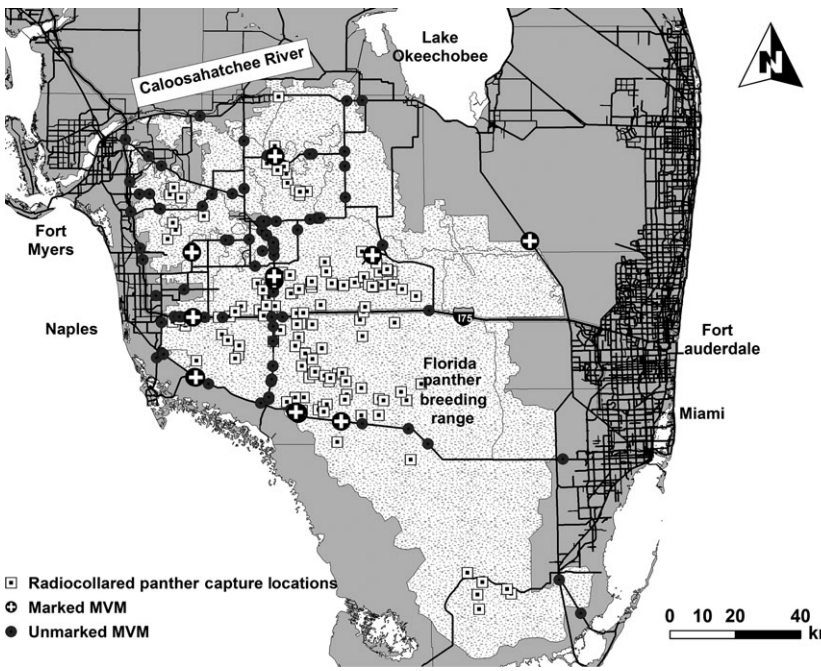

Fig. 2. Delineation of the breeding range of the Florida panther in southern Florida, USA. A 40-mile stretch of U.S. Interstate 75 has been fitted with wildlife underpasses and continuous high fending to reduce wildlife road mortalities on this high-speed roadway. Squares represent radiocollared panther capture locations, circles with crosses represent motor vehicle mortalities (MVMs) of radiocollared panthers, and dark circles represent MVMs for unmarked panthers.

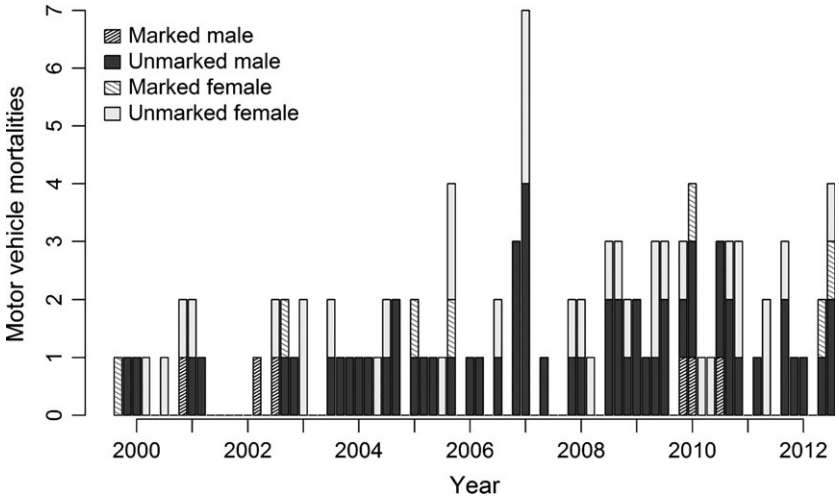

Fig. 3. Motor vehicle mortality (MVM) events for marked and unmarked Florida panthers observed within the study area during each bimonthly sampling period from 2000 to 2012. Marked counts include both reported and unreported MVMs, but unmarked counts include only those reported to wildlife officials by the public.

Radiocollars could fail at any point during the study (e.g. due to battery life), so we considered individuals with functional transmitters as 'marked' and those without functional transmitters as 'unmarked'. An additional complication was that marked individuals were introduced to the population from within-season capture events (primarily during the winter months). We therefore modified eqn 2 to accommodate the addition of marked individuals from within-season marking events as well as sex-dependent parameters (see Appendix S1).

Out of $M_1 = 64$ males and $M_2 = 76$ females marked for some period during the study, 12 were reported MVMs, 1 was an unreported MVM, and 63 were 'natural' (i.e. non-MVM) mortalities. A naïve estimate for the bimonthly MVM probability across the entire study is therefore $13/(\sum_{s=1}^{13}\sum_{t=1}^{6}\sum_{g=1}^{2}\sum_{i=1}^{M_g} q_{g,s,t,i}) = 0 \cdot 007$ (SE = 0·002). Similar to other panther studies (Sollmann *et al*. 2013), the sparseness of our data limited the complexity of covariate models for the parameters ($P_{g,s,t,i}$, $D_{g,s,t,i}$, $r_{g,s,t,i}$ and $U_{g,s}$). We investigated simple additive models with combinations of sex, age (on log scale), age at initial capture (on log scale), bimonthly sampling period and year effects on $P_{g,s,t,i}$ and $D_{g,s,t,i}$. To explain the MVM process, we developed an 'index of risk' covariate for $D_{g,s,t,i}$ based on traffic volume and road density (see Appendix S2). We also investigated models with no sex, temporal or individual covariates (hereafter 'constant' models), as well as an age by sex interaction model for $P_{g,s,t,i}$. Only a single unreported marked individual MVM was observed; hence, only constant models for $r_{g,s,t,i}$ were included (i.e. $r_{g,s,t,i} = r$). With relatively few unmarked individual MVMs reported each year (Fig. 3), we suspected yearly effects on $U_{g,s}$ could be numerically unstable, imprecise and overly sensitive to relatively small fluctuations in $u_{g,s,t}$. We therefore investigated more parsimonious models on $\log(U_{g,s})$, including constant, linear, quadratic and cubic trend models. To examine whether the male and female unmarked populations sizes were similar each year, we also included models that constrained $U_{1,s} = U_{2,s}$.

We standardized continuously valued individual covariates and assumed they are (approximately) normally distributed with mean and variance calculated from the marked individuals: for example, with a single time-invariant individual covariate z_i, $\log(D_{g,s,t,i}) = \boldsymbol{x}'_{g,s,t,i}\boldsymbol{\beta} + z_i^*\alpha$ and $\bar{D}_{g,s,t} = \int_{-\infty}^{\infty} \exp(\boldsymbol{x}'_{g,s,t,i}\boldsymbol{\beta} + z^*\alpha) N(z^*)dz^* = \exp(\boldsymbol{x}'_{g,s,t}\boldsymbol{\beta} + \frac{\alpha^2}{2})$, where $z_i^* = \frac{z_i - \mu_z}{\sigma_z}$, $\mu_z = 1/M\sum_{i=1}^{M} z_i$, $\sigma_z^2 = 1/(M-1)\sum_{i=1}^{M}(z_i - \mu_z)^2$ and $N()$ is the standard normal density.

Following the recommendation of Doherty, White & Burnham (2012), we ran all possible combinations of covariate models for MVM rate ($D_{g,s,t,i}$), natural mortality rate ($P_{g,s,t,i}$), unmarked adult male abundance ($U_{1,s}$) and unmarked adult female abundance ($U_{2,s}$). We evaluated the support for each model using Akaike's information criterion (AIC_c) adjusted for small sample sizes (Burnham & Anderson 2002). Population estimates and unconditional variances for each season were model-averaged based on AIC_c weights, with 95% logarithm-transformed confidence intervals calculated based on a *t*-distribution with $\sum_{s=1}^{S}\sum_{t=1}^{T_s}\sum_{g=1}^{2}\sum_{i=1}^{M_g} q_{g,s,t,i} + 2\sum_{s=1}^{S} T_{s-1} = 2135$ degrees of freedom. All analyses were performed in R (R Core Team 2013) using maximum likelihood methods, and variances for derived parameters were approximated using the delta method. Data and R code to perform our analysis are provided in Data S1.

Results

With 9% of the AIC_c weight, the best-supported model included the risk covariate and bimonthly variability in MVM rate ($D_{g,s,t,i}$), an age by sex interaction on natural mortality rate ($P_{g,s,t,i}$), a (log scale) quadratic trend model for the unmarked male population ($U_{1,s}$) and a (log scale) linear trend model for the unmarked female population ($U_{2,s}$). The estimated bimonthly reporting probability ($r_{s,t}$) from this model was 0·93 (SE = 0·07). This model estimated lower MVM rates from July to October and greater MVM rates in late spring (May to June) and early winter (November to December), with $D_{g,s,t,i}$ increasing with our risk covariate (Fig. 4). Sex- and age-dependent estimates for natural mortality rate ($P_{g,s,t,i}$) from this model are reported in Appendix S3.

There was considerable model selection uncertainty across the 1905 fitted models, but 98% of the AIC_c weight was allocated to models including the risk covariate on MVM rate and an age by sex interaction on natural mortality rate (see Appendix S4). With a model-averaged logit regression coefficient $\beta = 0.75$ (SE = 0·03) for the risk covariate, we found overwhelming evidence that MVM rate increases as a function of road length and AADT volume within a panther's home range. We found no evi-

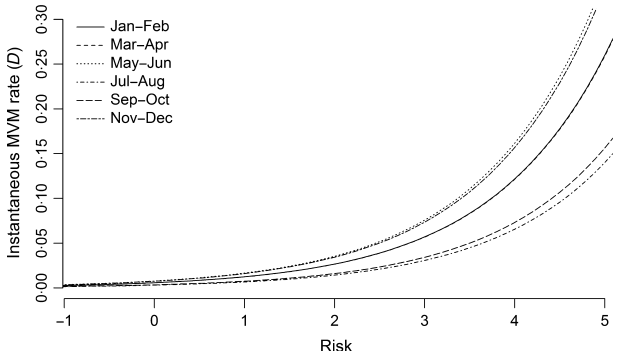

Fig. 4. Minimum AIC_c model estimates of bimonthly motor vehicle mortality (MVM) rate for Florida panthers from 2000 to 2012 as a function of the standardized index of risk covariate. The standardized index of risk covariate had an observed range from -0·8 (lowest risk) to 4·9 (highest risk) for marked panthers.

dence for constant, sex, age or yearly effects on MVM rate. There was some uncertainty about the best model for MVM rate, with 62% of the AIC_c weight allocated to models for $D_{g,s,t,i}$ that included both risk and bimonthly variability, but the primary source of model selection uncertainty was attributable to the unmarked population trend models. For males, quadratic (46% of AIC_c weight), linear (34%) and cubic (18%) trend models received the most support. For females, linear (38%), constant (29%), quadratic (20%) and cubic (13%) trend models received the most support. We found virtually no AIC_c support for models with year-dependent effects on unmarked abundance, with 0·1% and 0·0% of the AIC_c weight for males and females, respectively.

Model-averaged abundance estimates suggest an increasing then stabilizing adult male panther population and a slightly increasing or stabilizing adult female panther population from 2000 to 2012 (Fig. 5). However, with an average annual coefficient of variation of 29% (SE = 0·01), these changes in population size from 2000 to 2012 were not statistically different based on 95% confidence interval overlap. Although confidence intervals do not suggest a difference between the annual population estimates for males and females, we found little support for the constrained models assuming equal unmarked population sizes for males and females (16% of total AIC_c model weight).

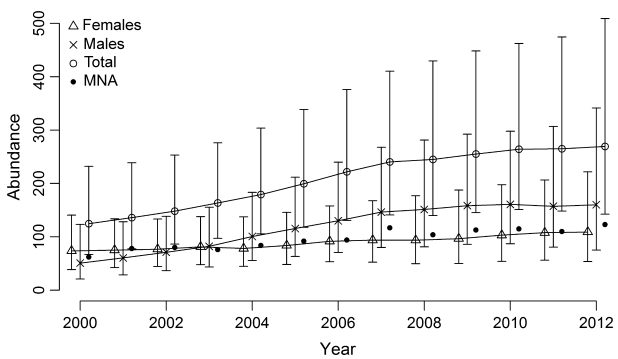

Fig. 5. Annual estimates for the subadult and adult (≥1 year old) Florida panther population size using the breeding range from 2000 to 2012. Separate estimates are provided for male and female populations. Total counts for the minimum number assumed alive (MNA) based on physical evidence (McBride *et al.* 2008) are included for comparison.

Discussion

We have capitalized on a tendency for the public to report MVMs of species of concern to estimate the population size of an endangered animal that has heretofore been impossible due to logistical constraints commonly encountered for rare, cryptic and broad-ranging species. In addition to public reporting of MVMs, our methodology relies on routine telemetry monitoring that allows the location and survival of a marked subset of the population to be closely followed, thereby allowing estimation of MVM and reporting probability. By relying on the public for sampling the unmarked segment of the population, our methodology comes at little additional cost to ongoing telemetry studies. By relying on the broad network of roads throughout the breeding range of the Florida panther, we demonstrated how our approach facilitates sampling of a much larger geographic area that would otherwise be impractical or inaccessible (e.g. private land) for researchers using more expensive and field-intensive alternatives that rely on live capture or cameras for sampling the unmarked segment of the population (e.g. Sollmann *et al.* 2013). For rare and elusive species that are very difficult to sample using conventional methods, we believe this framework holds much promise for producing defensible estimates of abundance (and its uncertainty) from limited and unconventional sources of data.

Our approach shares some similarities with mark–resight methodology (e.g. White & Shenk 2001). Similar to mark–resight, the most fundamental assumption of our approach is that marked individuals are representative of the entire population in terms of MVM probability, MVM reporting probability and natural survival probability. This assumption is often violated in standard mark–resight studies whenever there is individual variation in sighting probabilities and the marked population is selected based on sightability (McClintock & Hoeting 2010). This was not the case for our study because the marked population was established through capture events (not MVM events). Random or systematic sampling of individuals for marking is difficult to achieve in practice, but efforts can be made at the design stage to help achieve a suitably representative sample. In our case, marked panthers were captured within the large parcels of public lands that support panthers throughout the breeding range. In terms of MVMs and natural survival rates, we have no reason to suspect our marked animals differed from unmarked individuals beyond the individual variation that can be explained by factors such as age, sex and risk covariate. If panthers maintained very small home ranges and were always marked near roads with high

MVM risk (or within protected areas with low MVM risk), then this could induce bias in our abundance estimator. Although panthers were marked on public lands that tend to have fewer roads than private lands, marked panthers did not obey these boundaries (i.e. they were frequently observed on private land).

It is conceivable that the presence of a telemetry collar could affect the MVM reporting rate. A motorist who strikes a collared panther could be more likely to report the incident in the interest of science, but could also be less likely to report out of (unfounded) fear of recrimination. Given the volume of motor vehicle traffic on the roads of southern Florida and the prominence of panthers with the public, we would only expect different MVM reporting probabilities for marked panthers if motorists were consistently attempting to hide marked carcasses from view. We presently have no evidence in support of such a scenario. Because we had no reason to suspect otherwise, MVM reporting probability was assumed to be constant over time. Although we considered models that included both bimonthly and annual variation in MVM rate, the best-supported models assumed no annual variation. This may be explained by the sparseness of the data.

By relying on a representative sample of marked individuals selected independently of the sighting process, mark–resight methods do not require that the area searched be the entire study area (Bowden & Kufeld 1995). Individual variation in MVM probability (e.g. due to road density) does not induce bias in abundance point estimates, but if not accounted for, its uncertainty can be underestimated. We therefore used a surrogate for sampling intensity (i.e. road length and traffic volume) to help explain individual variation in MVM probability. Although annual road length and traffic volume data were unavailable for our study, it could be important to account for temporal trends in these covariates for long-term population monitoring. For example, if human development and population growth leads to increases in road density and traffic volume in some areas during the course of a study, so too may the MVM risk for individuals with home ranges that include these areas.

Given the sparseness of the panther MVM data, we found overwhelming support for (log scale) trend models on the unmarked population sizes. We found the most support for increasing linear or quadratic trend models for the unmarked male population and increasing linear trend or stable models for the unmarked female population. Although these trend models proved more parsimonious and yielded more stable estimates than the most general year-dependent models, the biological interpretation of these models requires additional care. Trend models on the unmarked population size can only be interpreted as the overall population trend if the number of marked individuals remains relatively constant or is a small proportion of the total population. The number of marked panthers in our study was relatively constant due to similar winter capture efforts each year, with the number of marked males ranging from 10 to 17 per year (median = 13, SD = 2·3) and the number of marked females ranging from 10 to 25 per year (median = 20, SD = 4·9).

We made several modifications to the 'closed' population model (eqn 1) to accommodate a lack of demographic and geographic closure within each year of the panther study. However, our 'open' model for the panther population using the study area each year is still approximate because it does not explicitly account for the within-year movement or recruitment processes. For example, an unmarked individual recruited to the adult population in November is (incorrectly) treated as if it had been present for the entire year by our approximate likelihood. A single marked male permanently emigrated north of the breeding range, but we did not observe any temporary emigration on or off the breeding range by marked panthers. Given that panthers persist as a single, isolated breeding population in south Florida, we had little to no concern about potential biases induced by immigrants moving into the study area from another population. However, we investigated the potential biases induced by within-season *in situ* reproduction through simulation experiments. We found our approximate likelihood performed well for a realistically simulated population under similar sampling conditions to the panther study, with negligible bias (-0.1%) and near-nominal 95% confidence interval coverage (92·1%) of open population abundance (see Appendix S5).

Because the panther population was not closed, the population using the study area each year is clearly larger than the actual population within the study area at any given point in time. Our open population estimates are therefore inappropriate for inferences about panther density. Lack of geographic closure can be readily handled under our framework to produce estimates suitable for density (McClintock & White 2012), but natural mortality and *in situ* reproduction pose additional challenges for estimating population density. It may be possible to utilize auxiliary demographic information to estimate panther density using post hoc analysis or integrated population modelling (e.g. Conn *et al.* 2008); this is the focus of additional research.

In eqns 1 and 2, we effectively assume that carcasses persist long enough to be reported with nonzero probability during the sampling period in which the MVM event occurred. All reported MVMs for marked panthers occurred within days of the MVM event, and given the size of the carcasses, the persistence rate of panthers on roadways is likely to be very high. However, this may not be the case for smaller species or other carcass recovery programmes. Unreportable carcasses arising from removal (e.g. due to scavenging) or degradation (e.g. due to decomposition) result in r being redefined as a combined 'persistence and reporting' probability in eqns 1 and 2, but this is not a problem for abundance estimation

because all unmarked encounters consist of carcasses that both persisted and were reported. For example, the estimator does not necessarily need to distinguish unreported MVMs that were intact but obscured behind roadside vegetation from those that were dragged off the roadway by scavengers (but it is certainly possible to do so). However, when reporting rates are low and the duration of the sampling period is short relative to carcass persistence, then our modelling approach may not be appropriate because we assumed that mortality events occurred during the sampling period in which they were observed.

MANAGEMENT IMPLICATIONS FOR THE FLORIDA PANTHER

Our Florida panther abundance estimates suggested the adult population has increased across its core reproductive range over the past decade, with possible stabilization in recent years. Despite low MVM probabilities, we achieved an average coefficient of variation of 29%. This precision is reasonable and similar to other panther studies (Sollmann *et al.* 2013). However, our model-averaged confidence intervals were still too large to conclude there were significant increases in population size from 2000 to 2012. Furthermore, upper confidence interval bounds in later years (e.g. 509 panthers in 2012) exceeded population estimates we believe could be supported within the breeding range of the Florida panther. These higher upper bounds are likely an artefact of a low MVM probability, which was about 0·04 (SE = 0·01) annually during our study. Although we chose to let these data 'speak for themselves', additional model structure could incorporate information about the carrying capacity of the breeding range.

Perhaps most informative are the estimated lower bounds for the annual population estimates for the panther breeding range. As expected, we consistently found the lower bounds exceeded MNA counts based on physical evidence (see Fig. 5), but our annual population estimate generally follows the same trend as the MNA method through the course of the study period. Progress associated with recovery of critically endangered animals should preferably rely on conservative measures of population estimates or lower bounds, especially when data are sparse due to the challenges of monitoring rare species (Miller & Waits 2003; Mills 2007). Our estimated lower bounds indicate this single population may never have exceeded 150 individuals between 2000 and 2012. As part of the recovery criteria for the Florida panther, three distinct populations of 240 individuals must be established before delisting. Two distinct populations of 240 individuals must be maintained for two panther generations (12 years) to downlist the subspecies to threatened. Although our results do not support a change in listing status for the Florida panther based on these established recovery criteria, they do suggest that management initiatives (e.g. genetic restoration, wildlife underpasses and corridors) to this point appear to be working. Our rmethodology can be continually applied on an annual basis at little additional cost and could help alert managers if the population appears to be declining, stabilizing or continuing to increase.

A novel methodology recently introduced by Chandler & Royle (2013), which we refer to as spatial mark–resight, was recently investigated for estimating Florida panther density using trail cameras (Sollmann *et al.* 2013). Although very useful and promising, the estimates of Sollmann *et al.* (2013) were limited to 2 years on a relatively small study area (241 km^2) on public land. Even if access to private lands was unrestricted, it would likely be prohibitively expensive and field intensive to continuously monitor panther density over its entire range using spatial mark–resight. In addition to routine telemetry monitoring, spatial mark–resight incurs substantial camera, field vehicle, fuel, battery and labour costs. Our approach utilizes data that are already collected as part of routine monitoring, and its costs are therefore negligible in comparison. However, we ultimately believe the most precise and cost-effective approach for continued monitoring across the entire breeding range of the Florida panther will combine all sources of available information (e.g. spatial mark–resight and mark–recapture, MVM, telemetry, recruitment data) in a spatially explicit integrated population model (e.g. Chandler & Clark 2014).

Our abundance model was developed for historical data that were originally collected for purposes other than population size estimation. Despite a sparse data set, we were able to obtain useful information about abundance of panthers while accounting for imperfect detection. This is a substantial improvement compared to indices of abundance derived from uncorrected minimum counts (e.g. MNA). Should researchers wish to pursue our methodology for other species as a less expensive means for long-term population monitoring, we suggest a focus on improving precision by devoting additional resources to maintaining a relatively large pool of marked (i.e. radio-collared) individuals in their focal population. Sample sizes for unmarked individuals could also potentially be increased through awareness campaigns encouraging the public to report encounters with wildlife. Of course, there are cost-benefit trade-offs that practitioners must consider when attempting to increase sample sizes under this framework.

Although initially developed for the Florida panther, our methodology is not limited to this particular species or aspect of human–wildlife ecology. Because it relies on citizen-based science, our technique could be adapted for any population that is encountered by a reporting public and contains a subset of closely monitored marked individuals. Harvested populations are an obvious example, although these studies will typically have sufficient recovery data to support more complicated modelling approaches than proposed here (e.g. Conn *et al.* 2008). Other examples include reports of avian wind farm collisions, beached whales or marine mammal boat strikes, which conceivably could be

utilized under this framework for long-term population monitoring over broad geographic areas.

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Data accessibility

Panther data: uploaded as online supporting information. R scripts: uploaded as online supporting information

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Supporting Information

Additional Supporting Information may be found in the online version of this article.

Appendix S1. Modified likelihood.

Appendix S2. Index of risk covariate.

Appendix S3. Natural mortality rates.

Appendix S4. Model selection.

Appendix S5. Simulation study.

Data S1. Data and R code.

Appendix S1. Modified likelihood

For our Florida panther study, an additional complication was that marked individuals were introduced to the population during within-season capture events (primarily during the winter months). We therefore modified Eq. 2 to accommodate the addition of marked individuals from within-season marking events as well as sex-dependent parameters:

$$L(\boldsymbol{y}, \boldsymbol{u} | \boldsymbol{D}, \boldsymbol{r}, \boldsymbol{P}, \boldsymbol{U}) \approx \prod_{s=1}^{S} \prod_{t=1}^{T_s} \prod_{g=1}^{2} \left[\prod_{i=1}^{M_g} \text{Categorical}\left(y_{g,s,t,i}; D_{g,s,t,i}, r_{g,s,t,i}, P_{g,s,t,i}\right) \right]$$

$$\times \text{Binomial}\left(u_{g,s,t}; U_{g,s} - \sum_{k=1}^{t-1} u_{g,s,k} - m^*_{g,s,t}, \frac{\bar{D}_{g,s,t}\{1 - \exp(-\bar{Z}_{g,s,t})\}\bar{r}_{g,s,t}}{\bar{Z}_{g,s,t}} \right)$$

where $g \in \{1,2\}$ respectively corresponds to male and female, $q_{g,s,t,i} = 1$ is an indicator for whether individual *i* of sex g was ≥1 year old, alive, within the breeding range, and with a functional transmitter at the beginning of period *t* during season *s* ($q_{g,s,t,i} = 0$ otherwise), $u_{g,s,t}$ is the total number of adult unmarked reported MVMs within the breeding range for sex g, and $m^*_{g,s,t} = \sum_{k=2}^{t} I\left(\sum_{j=1}^{k-1} q_{g,s,j,i} = 0\right) I\left(q_{g,s,k,i} = 1\right)$ is the cumulative number of newly marked individuals from within-season marking events for $t = 2, \ldots, T_s$ (with $m^*_{g,s,1} = 0$). In some instances, individuals were newly marked at ≤1 year old or marked individuals were released as adults from captivity; these individuals were not included in calculating $m^*_{g,s,t}$ if they were not a member of the within-season adult unmarked population at any point prior to release. We derive the total population sizes using the breeding range during each year as $N_{g,s} = M_{g,s} + U_{g,s} - m^*_{g,s,T_s}$. The total population size using the breeding range was then calculated as $N_s = N_{1,s} + N_{2,s}$, with variances derived using the Delta method (Casella & Berger 2002).

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Appendix S2. Index of risk covariate

To explain the MVM process, we developed an "index of risk" covariate for $D_{g,s,t,i}$. We calculated 95% fixed kernel home ranges using the plug-in smoothing parameter in R (R Core Team 2013) for all 140 radiocollared panthers from telemetry location data collected during 2000-2012. These home ranges were merged in ArcGIS 9.3 (ESRI, Redlands, CA, USA) and the resulting shapefile was divided into 1 km^2 grid cells. A road layer with attribute data delineating the average annual daily traffic (AADT) volume was intersected with this shapefile as a mixture of state and county traffic data. This road layer was further processed by deriving attribute data for total length of road and average AADT volume within each 1 km^2 cell of the shapefile. Each cell within the study area was subsequently weighted based on the proportion of telemetry locations within each cell to calculate an overall index of risk for each individual (risk_i):

$$\text{risk}_i = \sum_{c=1}^{C_i} \left(\frac{n_{c,i} + 1}{\sum_{j=1}^{C_i} n_{j,i} + C_i} \right) \left(\frac{A_{c,i} - \mu_A}{\sigma_A} + \frac{L_{c,i} - \mu_L}{\sigma_L} \right),$$

where C_i is the number of 1 km^2 cells completely or partially encompassed within the estimated 95% fixed kernel home range for marked individual i, $n_{c,i}$ is the number of telemetry locations for individual i in cell c, $A_{c,i}$ is the mean AADT value in cell c, $L_{c,i}$ is the total length of road in cell c, μ_A and μ_L are the average AADT and road length values across all cells in the study, and σ_A and σ_L are the respective standard deviations. Segments of roads with high fencing and wildlife underpasses (e.g., U.S. interstate highway I75) were omitted from calculations for our index of risk.

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Appendix S3. Natural mortality rates

Estimates for the age- and sex-dependent natural mortality rate $\left(P_{g,s,t,i}\right)$ based on the minimum-AIC_c model are reported in Fig. S1. While no significant trend was found for males, females exhibited an increasing natural mortality rate with age. These estimates are consistent with previous studies of Florida panther survival (Benson *et al.* 2011).

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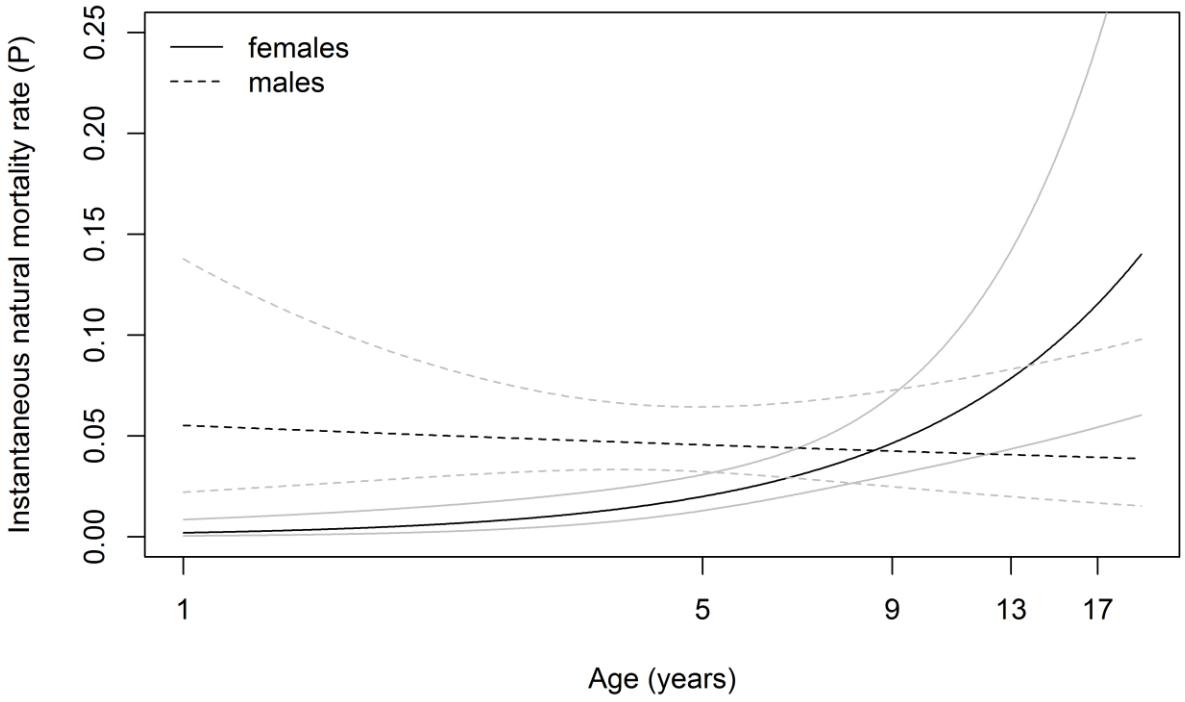
Fig. S1. Age- and sex-dependent natural mortality rate $\left(P_{g,s,t,i}\right)$ from the minimum-AIC_c model. Lighter-shaded lines indicate 95% confidence bands.



Appendix S4. Model selection

Table S1. AIC_c model selection results for Florida panther abundance based on motor vehicle mortalities (MVM), including AIC_c model weights (ω) and number of parameters (K). Presented models accounted for top 95% of AIC_c model weight and included constant (.), linear trend (T), quadratic trend (T2), cubic trend (T3), bimonthly sampling period (time), risk, and age by sex (age*sex) covariate models for unmarked male population abundance (U_1), unmarked female population abundance (U_2), MVM rate (D), and natural mortality rate (P). All models assumed a constant MVM reporting probability (r). Models assuming similar male and female unmarked population sizes are indicated by $U_1 = U_2$.

Model							AIC_c	ω	K
.	T	T2	T3	time	risk	age*sex			
	U_2	U_1		D	D	P	1005.2	0.09	17
U_2		U_1		D	D	P	1005.5	0.08	16
	U_1, U_2			D	D	P	1005.9	0.07	16
U_2	U_1			D	D	P	1006.1	0.06	15
	U_2	U_1			D	P	1006.2	0.06	12
U_2		U_1			D	P	1006.5	0.05	11
		$U_1 = U_2$		D	D	P	1006.8	0.04	15
	U_1, U_2				D	P	1006.9	0.04	11
		U_1, U_2		D	D	P	1007.0	0.04	18
U_2	U_1				D	P	1007.1	0.04	10
	$U_1 = U_2$			D	D	P	1007.2	0.03	14
	U_2		U_1	D	D	P	1007.3	0.03	18

U_2			U_1	D	D	P	1007.5	0.03	17
		U_1	U_2	D	D	P	1007.6	0.03	19
	U_1	U_2		D	D	P	1007.6	0.03	17
		$U_1 = U_2$			D	P	1007.8	0.03	10
		U_1, U_2			D	P	1008.0	0.02	13
			$U_1 = U_2$	D	D	P	1008.1	0.02	16
	$U_1 = U_2$				D	P	1008.2	0.02	9
	U_1		U_2	D	D	P	1008.2	0.02	18
	U_2		U_1		D	P	1008.2	0.02	13
U_2			U_1		D	P	1008.5	0.02	12
		U_1	U_2		D	P	1008.6	0.02	14
	U_1	U_2			D	P	1008.6	0.02	12
		U_2	U_1	D	D	P	1009.1	0.01	19
			$U_1 = U_2$		D	P	1009.1	0.01	11
	U_1		U_2		D	P	1009.2	0.01	13
			U_1, U_2	D	D	P	1009.7	0.01	20

Appendix S5. Simulation study

We conducted a simulation study to investigate the properties of our approximate open population model for Florida panther abundance. Mimicking the panther study, we generated $S = 13$ seasons of data, where each season was divided into $T_s = 6$ $(s = 1, \dots, S)$ sampling periods. Starting with an initial population size of $N_1 = 115$ subadults and adults (≥1 year old), we allowed for a lack of demographic closure through "natural" (i.e., non-MVM) mortality and recruitment within seasons. Demographic inputs were derived from the recent literature. We assumed a 1:1 sex ratio and derived a natural mortality rate $P_{s,t} = 1 - (0.857)^{\frac{1}{6}} = 0.025$ based on annual estimates reported by Benson et al. (Benson *et al.* 2011). Based on estimates from Hostetler et al. (Hostetler *et al.* 2010; Hostetler *et al.* 2012), we derived an annual recruitment rate of 0.362 1-year-olds per female from *in situ* reproduction. To mimic a "birth-pulse" in late spring, we apportioned this annual recruitment rate to each sampling period based on litter counts from den visits since 1992 (D. Onorato, unpublished data). For each sampling period, this yielded 1-year-old recruitment rates of $h_{s,1} = 0.06, h_{s,2} = 0.10, h_{s,3} = 0.10, h_{s,4} = 0.06, h_{s,5} = 0.03$, and $h_{s,6} = 0.02$ per female for $s = 1, \dots, S$. To account for capture events that were concentrated during the winter months of the panther study, we allowed unmarked individuals to become marked within seasons. After an initial capture probability $p_{1,1} = 0.25$ to establish a marked population, we specified $p_{s,T_s} = 0.05$ for $s = 1, \dots, S$ and $p_{s,1} = 0.05$ for $s = 2, \dots, S$. We specified $\overline{D}_{s,t} = 0.007$ and $r_{s,t} = 0.92$ based on naive estimates from our marked panther data for 2000-2012. To simulate our "index of risk" covariate, we modeled $\log(D_{s,t,i}) = -5.24 + 0.7z_i$, where $z_i \sim N(0,1)$.

We generated 1000 datasets and fit model $D(risk)r(.)P(.)U(s)$, indicating a (temporally-constant) individually-varying risk model for D_i, a constant model for r and P, and a seasonal model for U_s:

$$L(\boldsymbol{y}, \boldsymbol{u}|\beta, \alpha, r, P, \boldsymbol{U}) \approx \prod_{s=1}^{S} \prod_{t=1}^{T_s} \left[\prod_{i=1}^{M} \text{Categorical}\left(y_{s,t,i}; D_i, r, P\right) \right]$$

$$\times \text{Binomial}\left(u_{s,t}; U_s - \sum_{k=1}^{t-1} u_{s,k} - m^*_{s,t}, \frac{\bar{D}\{1 - \exp(-\bar{Z})\}r}{\bar{Z}} \right),$$

where

$$\text{Categorical}\left(y_{s,t,i}; D_i, r, P\right) = \begin{cases} q_{s,t,i} \exp(-Z_i) + 1 - q_{s,t,i} & \text{if } y_{s,t,i} = 0 \\ \dfrac{q_{s,t,i} D_i \{1 - \exp(-Z_i)\} r}{Z_i} & \text{if } y_{s,t,i} = 1 \\ \dfrac{q_{s,t,i} D_i \{1 - \exp(-Z_i)\}(1 - r)}{Z_i} & \text{if } y_{s,t,i} = 2 \\ \dfrac{q_{s,t,i} P \{1 - \exp(-Z_i)\}}{Z_i} & \text{if } y_{s,t,i} = 3, \end{cases}$$

$$\log(D_i) = \beta + z_i^* \alpha,$$

$$\bar{D} = \int_{-\infty}^{\infty} \exp(\beta + z^* \alpha) N(z^*) dz^* = \exp\left(\beta + \frac{\alpha^2}{2}\right),$$

$Z_i = D_i + P$, $\bar{Z} = \bar{D} + P$, $z_i^* = \frac{z_i - \mu_z}{\sigma_z}$, $\mu_z = 1/M \sum_{i=1}^{M} z_i$, $\sigma_z^2 = 1/(M-1) \sum_{i=1}^{M} (z_i - \mu_z)^2$, and $N()$ is the standard normal density. Because the population was not demographically closed within each season, the population using the study area each season was derived as $N_s = \sum_i I(\sum_{t=1}^{T_s} q_{s,t,i} > 0) + U_s - m^*_{s,T_s}$. We assessed model performance based on percent relative bias (PRB), coefficient of variation (CV), and percent 95% logarithm-transformed confidence interval (CI) coverage for N_s. Data generation and model fitting by maximum likelihood were performed in R (R Core Team 2013).

Based on our selected demographic inputs, the realized populations were relatively stable, with 63% slightly declining over the 13 seasons and an average decline of 0.7% per season (Fig. S1). Overall, our abundance estimator was generally unbiased with near-nominal coverage, with an average PRB of −0.1% (SD=0.49), average CV of 43% (SD=0.10), and average CI coverage of 92.1% (SD=0.27). For individual season estimates, average PRB ranged from −4.5% to 3.0%, average CV from 41% to 47%, and average CI coverage from 89.0% to 95.2%. Thus, despite relatively small sample sizes and low MVM rates, our approximate likelihood performed well for a realistically-simulated panther population under similar sampling conditions to our panther study.

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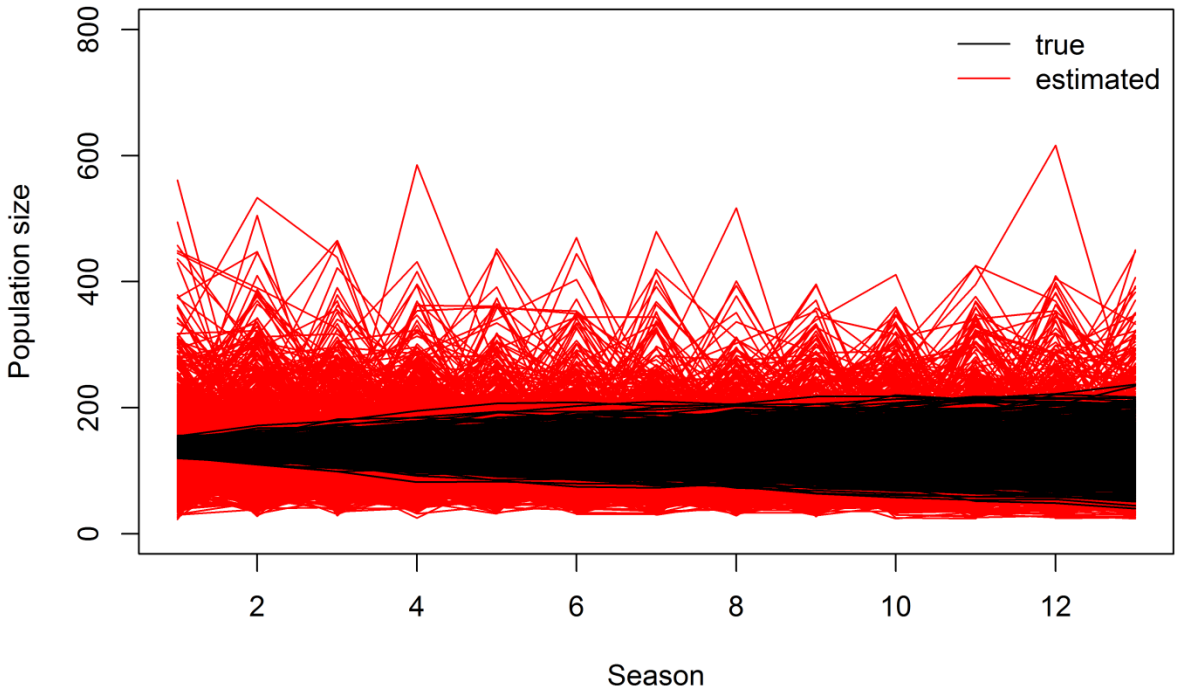
Fig. S1. True and estimated population sizes from 1000 simulations.



From:	Warren, Ken
To:	FW4 Vero Beach SFFO
Cc:	Jeff Fleming; Tom MacKenzie; Katherine Taylor; Kevin Godsea
Subject:	Weekend News Round-Up: Deadliest Month Ever for Florida Panthers; Everglades Restoration Funding Bill Passes Senate; Gov Scott Calls for More Pumping; Anti-hunting groups plan court action to stop second Florida bear hunt
Date:	Monday, May 02, 2016 8:52:53 AM

http://staugustine.com/news/florida-news/2016-04-30/april-has-been-deadliest-month-ever-endangered-florida-panthers-9#.VydM7UwrLcs

April has been deadliest month ever for endangered Florida panthers, with 9 killed

By JENNY STALETOVICH, Miami Herald, May 1, 2016

MIAMI — This April will go down as the bloodiest month yet for the Florida panther.

Nine of the endangered cats died, all but one killed along Southwest Florida highways and roads. Seven were males, almost all at the young age when they start looking to establish their own territory. Altogether, 20 panthers have died this year, a number on track to outpace last year's record-breaking 41 fatalities.

Why so many died, wildlife officials say, is simply a gory measure of their success.

"It's not the best way to document that increase, but it's still a fact we have to take into account," said David Schindle, Florida panther coordinator for the U.S. Fish and Wildlife Service.

The number also speaks to the increasing pressure from development for the wide-ranging panthers and particularly males, which need a territory of about 200 square miles. In recent months, the notoriously shy cats have made some unusual appearances: In March, a panther was photographed sitting on the porch of an east Fort Myers house. Two weeks later, a visitor to the Corkscrew Swamp spooked a panther sitting on a boardwalk and videotaped it racing past her.

Wildlife biologists estimate that between 90 and 180 panthers remain. But what constitutes a good number for conservation has been hotly debated in recent years. Ranchers and hunters have been pushing to scale back conservation, saying panthers have maxed out South Florida. Conservationist, however, argue more needs to be done to preserve shrinking habitat.

"It's death by a thousand cuts where this is not sustainable in the long term in our view unless we modify where and how we develop," said Jennifer Hecker, director of natural resource policy for the Conservancy of Southwest Florida. "We're not saying everything has to be restored or maintained in pristine condition. We're just asking those areas be retained as agriculture," that panthers use for habitat.

Panthers once roamed much of the Southeast. But by the 1990s, despite being included on the endangered species list in 1967, just 30 remained in Florida. To revive the population, eight female Texas cougars were released in 1995. The plan worked and numbers started climbing. A conservation goal was set to establish three separate populations of 240 panthers each in

their historic range. At the same time, development continued to squeeze the cats' habitat, leading to clashes between the cats and particularly ranchers.

Last year, at the urging of Commissioner Liesa Priddy, whose family owns a 9,000-acre ranch in panther territory for three generations, the Florida Fish and Wildlife Conservation Commission proposed scaling back the conservation plan to just one population.

After a five-hour public hearing, the commission dropped the plan. Two months later, Priddy was part of group of nine landowners who submitted plans for a sprawling project six times the size of Miami that would develop 45,000 acres in Collier County.

Schindle said his agency is now reviewing a habitat conservation plan for the project. This week, officials gave a preliminary presentation to the Collier County commission, which is already prompting concerns from conservationists.

"With road mortality being one of the leading causes of death, all the additional roadways needed for development would be an enormous impact," Hecker said.

"How are we going to continue to recover the species when right now mortality numbers are outpacing documented births?" she asked.

But property owner and hunters argue with so little land available, the conservation goal is unrealistic and that biologists are not doing a good job of counting panthers. Longtime survey methods that rely on radio collars, tracks, captures and photos in 2014 put the number of cats at 138. But using traffic fatalities as an estimate, the population in 2012 was calculated at 269.

http://www.sun-sentinel.com/news/florida/fl-senate-committee-everglades-20160428-story.html

U.S. Senate panel approves Everglades funding

By Dan Sweeney, South Florida Sun Sentinel, April 30, 2016

Nearly $1 billion could be headed from Washington to the Everglades under a bill approved by a U.S. Senate panel Thursday.

Some of the money would go to a $2 billion project that would send more water south from Lake Okeechobee through Everglades National Park.

Under the bill, $976.4 million of that cost will be paid by the federal government, with the rest from state and local sources. The project is the costliest of the 25 Army Corps of Engineers projects to be approved.

The project is designed to both restore Everglades wetlands and also divert water from flowing to the west and east, where it picks up agricultural runoff filled with nitrogen and other pollutants. A recent flow of water from Lake Okeechobee sent polluted water into the St. Lucie River to the east and the Caloosahatchee River to the west, causing a rush of brown water.

Environmentalists blamed pollution from the state's sugar industry, tourism took a hit, and

Gov. Rick Scott declared a state of emergency in Martin, Lee and St. Lucie counties. The pollution coincided with a massive fish kill in the Indian River Lagoon, but experts believe the two events are unrelated, as the brown water mostly flowed out into the ocean before reaching the northern part of the lagoon, where the fish kill occurred.

The Water Resouces Development Act would also greenlight dredging six feet from the bottom of Port Everglades. The new 48-foot depth would allow access to larger cargo ships, which will be able to cross a newly expanded Panama Canal starting June 26. That project will cost the federal government $220.2 million, with another $102.5 million in state and local funds.

Neither senator from Florida is on the committee, but both supported the projects.

"Getting this project approved is a major step in our ongoing efforts to restore the Everglades," Democratic U.S. Sen. Bill Nelson said in a statement. "It will help us not only restore an area that is the crown jewel of Florida's landscape, but is also a source of clean drinking water for millions in the state."

Republican U.S. Sen. Marco Rubio played a direct role in getting the Everglades project included in the package. Sen. Jim Inhofe, the chairman of the Senate's environment committee, is a climate change denier who takes a dim view of large-scale projects such as Everglades restoration. The Oklahoma Republican was the only senator to vote against the Comprehensive Everglades Restoration Plan when it passed the Senate in 2000. But according to Inhofe, Rubio persuaded him to include the Florida projects in the bill.

The bill also includes a third, much smaller project in Florida, with about $24.6 million from the federal government going to Flagler County for beach renourishment and storm damage protection.

The bill will still need to be approved in the full U.S. Senate and paired with similar legislation in the U.S. House of Representatives before going to President Barack Obama to be signed into law. With support from Everglades restoration's biggest critic in the Senate, the chances of passage are good.

It took just 15 minutes for the Senate Environment and Public Works Committee to send three bills to the full Senate.

"Maybe a record has been set," Inhofe said. "I don't know."

http://www.keysnet.com/2016/04/30/508173/senate-panel-oks-2-billion-everglades.html

Senate panel OKs $2 billion Everglades project

BY KEVIN WADLOW, Florida Keynoter, April 30, 2016

A $2 billion piece of Everglades restoration efforts that was stuck in the mud of government process gained traction Thursday.

The Central Everglades Planning Project, described as a series of engineering projects to hold and channel water around Lake Okeechobee south into the center of the Everglades, was

approved by a key U.S. Senate committee Thursday.

The Senate's Environment and Public Works Committee included the Central Everglades Planning Project as part of the Water Resources Reform and Development Act. That bill now is pending before the full Senate.

"Getting this project approved is a major step in our ongoing efforts to restore the Everglades," Florida U.S. Sen. Bill Nelson said. "It will help us not only restore an area that is the crown jewel of Florida's landscape, but is also a source of clean drinking water for millions in the state."

"Moving forward with components of the Central Everglades Planning Project ... will alleviate harmful freshwater releases to Florida's coastal estuaries while sending water south to Everglades National Park and Florida Bay and the Keys," said Cara Capp, Everglades restoration program manager for the National Parks Conservation Association.

This winter's record rains raised the level of Lake Okeechobee, forcing massive freshwater discharges through canals to the St. Lucie and Caloosahatchee estuaries in Central Florida, which have disrupted the natural ecosystem.

Florida Bay is suffering the effects of not having enough fresh water, which apparently has triggered a massive seagrass die-off.

"After three years of united advocacy among the Florida congressional delegation and community leaders, it was great to see the Senate include language to authorize CEPP in its 2016 water bill," U.S. Rep. Patrick Murphy (D-Fla. 18) said.

"This is a major win for our community and the fight to protect our waterways," Murphy said. "By working together, we were able to reach this critical milestone and will continue to make progress to move this and other Everglades projects forward to send more clean water south."

The CEPP funding missed a 2014 congressional vote because of a missed deadline for a key study.

http://www.sun-sentinel.com/news/fl-emergency-draining-boost-20160429-story.html

Gov. Scott calls for more emergency pumping into Everglades

By Andy Reid, South Florida Sun Sentinel, April 29, 2016

Gov. Rick Scott says more emergency pumping is needed to avoid flooding Everglades animals in western Broward and Miami-Dade counties.

Scott is calling on the federal government to extend the increased draining that sends more water than usual from Everglades sawgrass marshes in western Broward and Miami-Dade and into Everglades National Park.

Back in February, Scott and other state officials warned of a potential wildlife disaster if something wasn't done to reduce water levels that threatened to flood the high ground that deer, wading birds, panthers and other animals need to survive.

Now Scott is asking for federal approval to continue the emergency pumping that is otherwise scheduled to end by May 11.

The increased draining "has begun providing needed relief from the flooding," Scott wrote in a letter Thursday to federal officials.

"The State of Florida stands ready to continue these efforts that truly benefit our state's wildlife and economy," Scott said.

The Army Corps of Engineers would have to approve state plans to keep sending increased water levels through Shark River Slough and into Everglades National Park.

"We have received the Governor's request and are reviewing options," Army Corps spokesman John Campbell said Friday.

South Florida has been dealing with higher-than-usual water levels, from Lake Okeechobee to the Everglades, due to El Niño-driven rains during what was usually the state's dry season.

To reduce South Florida flooding risks, the Army Corps since January has been draining Lake Okeechobee water to the east and west coasts — even though that hurts coastal fishing grounds near Stuart and Fort Myers.

The governor maintains that allowing more water pumping into Everglades National Park could end up lessening the draining of Lake Okeechobee water to the coasts.

That's because lowering water levels in western Broward and Miami-Dade by sending more water into Everglades National Park could make room for pumping more Lake Okeechobee water into South Florida.

"Moving water south in this manner is highly preferred to high volume discharges east and west from Lake Okeechobee (that) harm our valuable Caloosahatchee and St. Lucie estuaries," the governor wrote to the Army Corps.

When Lake Okeechobee rises too high, the Army Corps drains water to the east and west coasts to lessen the strain on the 30-foot-tall, earthen mound surrounding the lake — relied on to protect South Florida from flooding.

The lake's erosion-prone dike is considered one of the country's most at risk of failing and remains in the midst of a decades-long rehab.

High lake levels since January have led to draining billions of gallons of lake water each day east into the St. Lucie River and west into the Caloosahatchee River — clouding delicate estuaries with dark, pollution-laden water that at times scares away fish and tourists alike.

The governor's proposal envisions creating an alternative route to the south for some of that lake water, by prolonging the extra pumping in Broward and Miami-Dade counties.

Getting more water to Everglades National Park, and filtering out pollutants along the way, is the goal of a multibillion-dollar state and federal Everglades restoration plan.

That involves using reservoirs, water treatment areas and pumps to recreate the natural flow of water that once existed from Lake Okeechobee to Florida Bay — before South Florida farming and development drained half the Everglades.

This emergency pumping has been a good "field test" for plans to pump more water south, said Kevin Kotun, Everglades National Park's chief hydrologist. Park officials support extending the increased pumping, he said.

Emergency pumping since February has already moved about 58 billion gallons of that water into Everglades National Park, according to the state.

That has delivered record-high water levels for this time of year for normally dry portions of Everglades National Park, according to Kotun. Portions of the park that typically have a foot of water are now about 2 feet deep, he said.

While in the long-term that could be good for restoring long-parched portions of the Everglades, in the short-term the influx of water has greatly reduced the wading bird nesting usually going on this time of year, Kotun said.

"There are few parts of the park that are dry now," Kotun said. "Things that like it wet are doing well.

http://staugustine.com/news/florida-news/2016-04-30/anti-hunting-groups-plan-court-action-stop-second-florida-bear-hunt#.VydFm0wrLcs

Anti-hunting groups plan court action to stop second Florida bear hunt

By KEITH MORELLI, Tampa Tribune, May 1, 2016

TAMPA — With more than 4,000 bears roaming the woods of Florida, state wildlife officials seem poised to allow another limited hunt this fall, in spite of widespread public opposition and focused protests by environmentalists and animal rights advocates.

Anti-hunting groups are gearing up to take the state to court or join other lawsuits, should wildlife resource officials in Tallahassee approve a second hunt in October

“We’re going to fight this,” said Frank Jackalone, senior field organizing manager with the Sierra Club in Florida. “I know wildlife lovers are going to do everything they can to stop it. The powers-that-be at FWC (Florida Fish and Wildlife Conservation) want to do another bear hunt. The question is, can we stop them.”

He said “any reasonable judge” would see that the state “botched” the hunt last year that resulted in hundreds of bears being killed in two days.

The Center for Biological Diversity, a group that aims to protect threatened and endangered species, submitted friend-of-the-court documents in support of a lawsuit filed last year to halt the hunt. That suit is still pending and whether it will come into play this year remains unclear, said Jaclyn Lopez, Florida director of the center.

“We are hopeful the FWC commissioners will look at this with fresh eyes; that they want to

protect black bears," she said. "They (bears) do represent rural Florida and we should not be hunting them."

A lawsuit to stop the hunt was filed last year by Chuck O'Neal, a Central Florida businessman, environmentalist and, since January, a candidate for the state Senate. He said the case remains active and he hopes to get a trial date before the scheduled October hunt.

In question, he said, are the population numbers on which the state based its decision and the "different facets of decision-making" within the commission.

"It's pretty clear," he said, "this is not a science-driven hunt. It's a political decision back-filled with junk science.

"We feel the population is actually in decline," he said. "If you look at the way they came up with their population numbers, they counted bears in a certain geographic area and then extrapolated that over the available habitat. But that habitat is ever decreasing; the forested areas are being replaced now by residential subdivisions."

He said most Floridians back his attempt to stop the hunt.

"I would say 19 out of 20 people I talk to are against the hunt," he said. "Occasionally, I'll run across that 20th person in favor of it. Even some hunters think the hunt last year was poorly designed and unnecessary."

At a meeting of the Florida Fish and Wildlife Conservation Commission earlier this month, commission Chairman Brian Yablonski said the issue will be discussed during a June meeting in Apalachicola on how a hunt, if approved, will be managed.

He pointed to the results of a survey last year, prior to the fall hunt in which more than 300 bruins were bagged, that estimated 4,350 adult black bears were living in a handful of bear management areas throughout the state.

"There is a process of how the hunt is set up, what the quota objectives are," Yablonski said during the commission meeting in Jupiter. "There's a ton of options out there."

Among the options, hunt protesters say: No hunt at all.

The 2015 hunt — the first in two decades — came about because there were a few bear attacks on humans in 2014, and state wildlife caretakers felt pressure to do something, Lopez said.

"The hunt was floated to address the perceived overpopulation issue," she said, "despite having no up-to-date population counts."

The results of the 2014-15 bear survey were released in March, five months after the bear hunt took place.

In support of the decision to allow the bear hunt, the state said the bear population was out of balance.

"The only thing out of balance with the bear population is the human population in the areas

where the two meet and don't get along," Lopez said, "and hunts do nothing to address those nuisance bears."

Lopez believes bears, more than deer and other game, seem to have a connection with people.

"A lot of Floridians probably don't even know we have bears in Florida," she said, "so, they seem to be a little more magical and mystical."

Commission wildlife biologists say the bear population has rebounded remarkably since the 1970s when there were between 300 and 500 bears traipsing around the woods. The population growth was so successful that in 2012, the Florida black bear was removed from the state's threatened species list, where it was listed since 1974.

The survey, conducted over 2014 and 2015, counted bears lumbering around five bear management units (BMU), that included large swaths of forests and swamps in the Panhandle, northern and central Florida and the Everglades.

Accompanying the estimated 4,350 adult bears in Florida were about 2,000 bear cubs, of which about half will survive into adulthood.

"The survey work in 2014 and 2015 clearly shows Florida has large and growing bear populations," said Thomas Eason, director of the commission's Division of Habitat and Species Conservation, in a March 24 statement. "It provides accurate estimates for all lands within the five recently surveyed BMUs and confirms that bears are one of Florida's greatest conservation success stories."

Hunt protesters contend that opening a season on bears is no way to treat a success story.

"I'm amazed at how there is such a concerted disregard for our iconic wildlife species in Florida, like the panther, the manatee and now the black bear," said Jackalone, with the Sierra Club in Florida, "It's like our agencies don't care anymore. They do what they want to do. They down-list them, de-list them and allow hunting and reckless activity to take its course."

More study should be done, he said, to determine the effect last year's hunt had on the ursine population.

"The prudent course would be to take a year off to let the black bear population recover from the slaughter of 2015," Jackalone said, "and then reassess the situation."

Wildlife scientists independent of the commission were silent last year about the hunt, he said, but this year may be different.

"Those experts, some of whom work in academia, were horrified by the outcome," Jackalone said, "and many spoke out after the hunt. We think that may be our best hope."

Still, he said, the hunt likely will take place. The same commissioners who approved it last year are still on the commission.

"The FWC is mainly about the business of hunting and fishing," Jackalone said, "so they are constantly trying to figure out how they can maximize that. Science is secondary to their

mission.”

Commission spokeswoman Tammy Sapp said a rule on the books passed last year provides for an annual bear hunt.

“So the default, the do-nothing alternative, provides for a bear hunt and how that is to be conducted,” she said. “The commission chairman has asked staff to bring a range of options to our June meeting. That includes the if, when and how options.”

All the options will be discussed, she said, including any new population numbers that may arise.

“We could decide to have a hunt similar to last year,” she said, “to not have a hunt, to modify the hunt.”

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"Being considerate of others will take you and your children further in life than any college or professional degree." - Marian Wright Edelman

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From: Dryden, Kim
To: Larry Williams; Victoria Foster; Roxanna Hinzman; Constance Cassler; Timothy Breen; David Shindle; Kevin Godsea
Subject: Fwd: mortality breakdown
Date: Monday, May 09, 2016 2:57:48 PM
Attachments: image001.png
image002.png

Folks - Its about time that we assess data on increases in traffic data and biogeography on traffic patterns in SW FL on panther mortality vs the "premise" that there is just more panthers. On a panther population of 100-160? Does that pass the laugh test as my friends from the Corps management used to tell me? The Corps, mind you. They recognize faulty or insufficient analysis above all.

I hear we are not analyzing increases in road needs for the HCP. I do not understand the basis for this decision. "But for " the development we don't need the roads and the roads are a major panther mortality feature. Plus more than a dozen other other issues that I could spell out but I could not participate in the "internal" conversation of the HCP since those links were not updated. Several other state and federal partners were excluded and they were not happy. I sent them the recording but that did not allow them or those of us in SW FL to interact in the discussion.

Ken - I appreciate that we will have additional opportunities to comment and that you will be making the rounds. Have you reviewed the Southwest Florida Comprehensive Watershed Plan or the daylong briefing that myself, refuges, recovery (panther coordinator), and Partners provided for VB? Please call me if you have any questions and please include me in any briefings you have with ES staff and refuges. I have 32 years on this issue. Sorry if I am not shy. I think faulty analysis can be challenged and the Service will not prevail in our decision.
---------- Forwarded message ----------
From: **Nottingham, Ben** <ben_nottingham@fws.gov>
Date: Mon, May 9, 2016 at 2:27 PM
Subject: Re: mortality breakdown
To: "Dryden, Kim" <kim_dryden@fws.gov>, Kevin Godsea <kevin_godsea@fws.gov>

Kim:

You nailed it...!

Ben Nottingham
Refuge Manager
FL Panther NWR
(239) 657-8010
cell 239-253-7009

On Mon, May 9, 2016 at 11:13 AM, Dryden, Kim <kim_dryden@fws.gov> wrote:

> This is just an anecdotal response. But the amount of traffic generated by the end of the recession, the current ramping up of the building industry (return of dump trucks), and the biogeography of the building expansion in Collier and Lee Counties is likely responsible. Reminder that the permit applications are up. Forcasting more of the same.
>
> I realize that the total number of panthers is part of the evaluation. But just look at what is happening around Naples and expanding areas outside Ft. Myers. Plus fill is being brought from much further east as very few coastal mines are available. I am sure there is a way to analyze the panther population increase vs the traffic volume and development permit increase. But to me it is an obvious factor and should be considered.
>
> On Wed, May 4, 2016 at 7:04 PM, Elizabeth Fleming <EFleming@defenders.org> wrote:
>
> > Mark
> >
> > Do you and the other panther biologists have any working hypotheses of why Aril 2016 has taken such a toll? Do you think the record wet weather caused panthers to use roads more than they usually would?
> >
> > Elizabeth
> >
> > Elizabeth Fleming
> >
> > Senior Representative, Florida
> >
> > Defenders of Wildlife

St Petersburg, Florida

Office: 727/823-3888

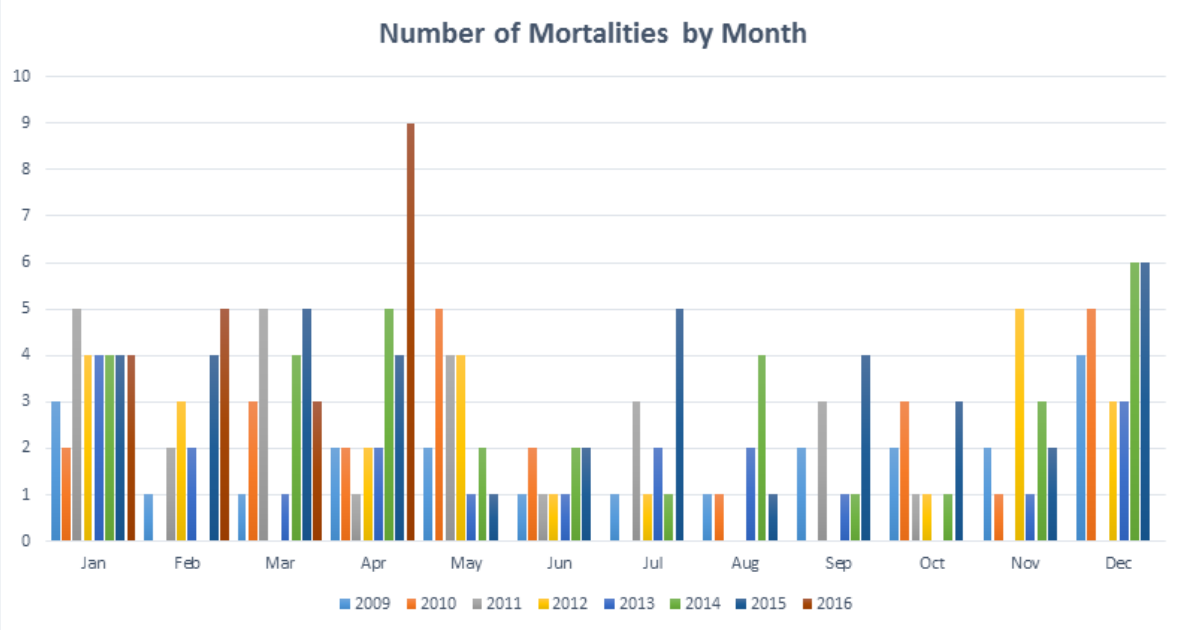
Cell: 727/410-0455

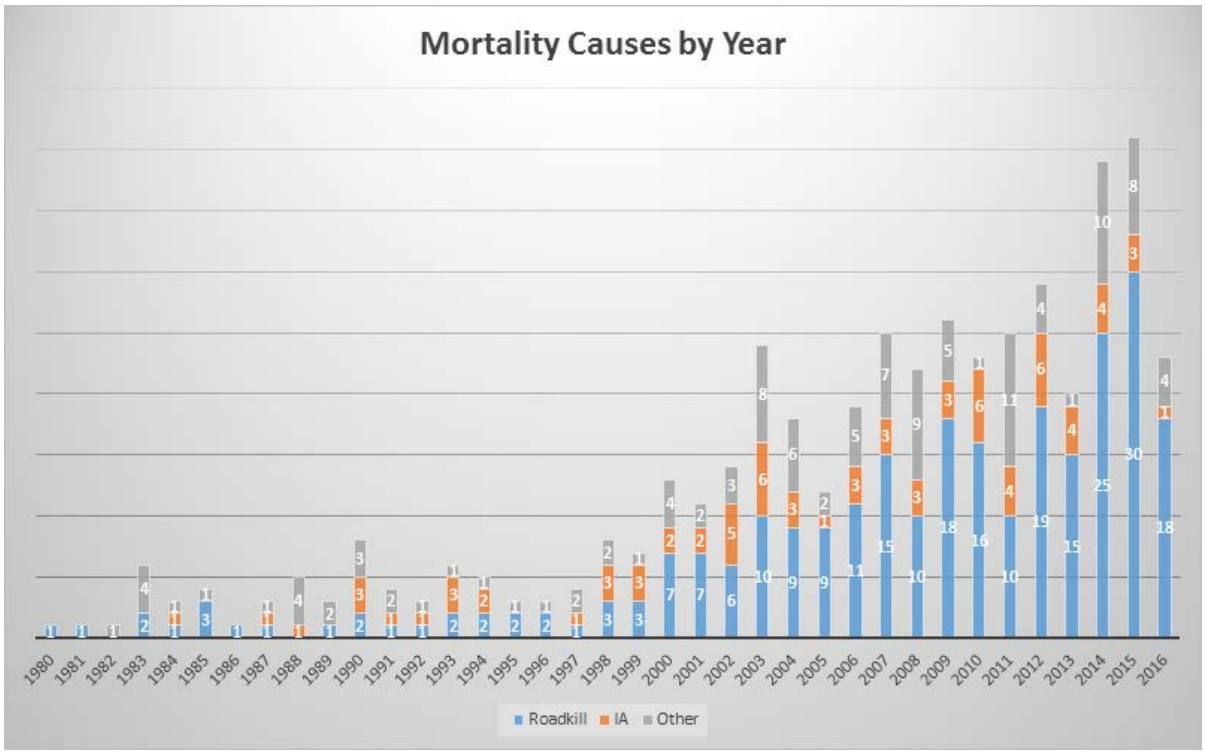
efleming@defenders.org

www.defenders.org

From: Lotz, Mark [mailto:Mark.Lotz@MyFWC.com]
Sent: Wednesday, May 04, 2016 3:21 PM
To: Warren, Ken <ken_warren@fws.gov>; Lisa Ostberg <onefloridapanther@gmail.com>; Amber Crooks <amberc@conservancy.org>; Nottingham, Ben <ben_nottingham@fws.gov>; Bob DeGross <bob_degross@nps.gov>; Elizabeth Fleming <EFleming@defenders.org>; Kim Dryden <Kim_Dryden@fws.gov>; Lisa Andrews <lisa_andrews@nps.gov>; Nancy Payton <nancypayton@fwfonline.org>; rpires@fgcu.edu; Gillan, Judy <judy.gillan@MyFWC.com>; Brad Cornell <millercornell@mindspring.com>; efpienaar@ufl.edu; Melissa Kreye <mkreye@ufl.edu>; Hirth, Diane <Diane.Hirth@MyFWC.com>; Katherine Taylor <katherine_taylor@fws.gov>; Jessica Sutt <jessica_sutt@fws.gov>; Segelson, Carli <Carli.Segelson@MyFWC.com>; Barraco, Liz <Liz.Barraco@MyFWC.com>; Danny Gwynn-Shapiro <Dannygs@fwfonline.org>; Korn, Jennifer <Jennifer.Korn@MyFWC.com>; Frank Jackalone <frank.jackalone@sierraclub.org>; David Shindle <david_shindle@fws.gov>; Tom MacKenzie <tom_mackenzie@fws.gov>
Cc: Land, Darrell <Darrell.Land@MyFWC.com>; Onorato, Dave <Dave.Onorato@MyFWC.com>
Subject: mortality breakdown

The question came up on today's panther response team outreach call about the claim in a recent news article about last month being the "deadliest ever." I've crunched the numbers and, not too surprisingly, it was. Below are a couple of charts that show the mortality trends. In the first one, mortalities by month, you can clearly see that April 2016 had the most documented mortalities. I've also included a breakdown of causes by year just for general interest purposes (2016 is current through today).





Mark Lotz, Panther Biologist

Florida Fish & Wildlife Conservation Commission

Division of Habitat & Species Conservation

Imperiled Species Management Section

Florida Panther Project

Naples Field Office

298 Sabal Palm Rd.

Naples, FL 34114-2572

(239) 417-6352

From: Warren, Ken [mailto:ken_warren@fws.gov]
Sent: Wednesday, May 04, 2016 10:30 AM
To: Lisa Ostberg <onefloridapanther@gmail.com>; Amber Crooks <amberc@conservancy.org>; Nottingham, Ben <ben_nottingham@fws.gov>; Bob DeGross <bob_degross@nps.gov>; Elizabeth Fleming <efleming@defenders.org>; Kim Dryden <Kim_Dryden@fws.gov>; Lisa Andrews <lisa_andrews@nps.gov>; Nancy Payton <nancypayton@fwfonline.org>; rpires@fgcu.edu; Gillan, Judy <judy.gillan@MyFWC.com>; Lotz, Mark <Mark.Lotz@MyFWC.com>; Brad Cornell <millercornell@mindspring.com>; efpienaar@ufl.edu; Melissa Kreye <mkreye@ufl.edu>; Hirth, Diane <Diane.Hirth@MyFWC.com>; Katherine Taylor <katherine_taylor@fws.gov>; Jessica Sutt <jessica_sutt@fws.gov>; Segelson, Carli <Carli.Segelson@MyFWC.com>; Barraco, Liz <Liz.Barraco@MyFWC.com>; Danny Gwynn-Shapiro <Dannygs@fwfonline.org>; Korn, Jennifer <Jennifer.Korn@MyFWC.com>; Frank Jackalone <frank.jackalone@sierraclub.org>; David Shindle <david_shindle@fws.gov>; Tom MacKenzie <tom_mackenzie@fws.gov>
Subject: Panther Outreach Call Today at 1 pm

Howdy,

Just a reminder that we'll have our monthly telecon this afternoon at 1 p.m. The conf call number is 866 613 8547. The passcode is 9874757.

Thanks.

--

Ken Warren

Public Affairs Officer

U.S. Fish & Wildlife Service

South Florida Ecological Services Office

1339 20th Street

Vero Beach, FL 32960-3559

Office Phone: 772.469.4323

Mobile Phone: 772.643.4407

Fax: 772.778.5498

"Being considerate of others will take you and your children further in life than any college or professional degree." - Marian Wright Edelman

Follow us on Twitter @USFWSVERO

--
Kim Dryden
U.S. Fish and Wildlife Service
Florida Panther and Ten Thousand Islands National Wildlife Refuge
12085 State Road 29S
Immokalee, FL 34142
CELL PHONE: (**USE FIRST**) 772-532-5614

Office Phone: 239-657-8016 Office FAX: 239-657-8002

--
Kim Dryden
U.S. Fish and Wildlife Service
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12085 State Road 29S
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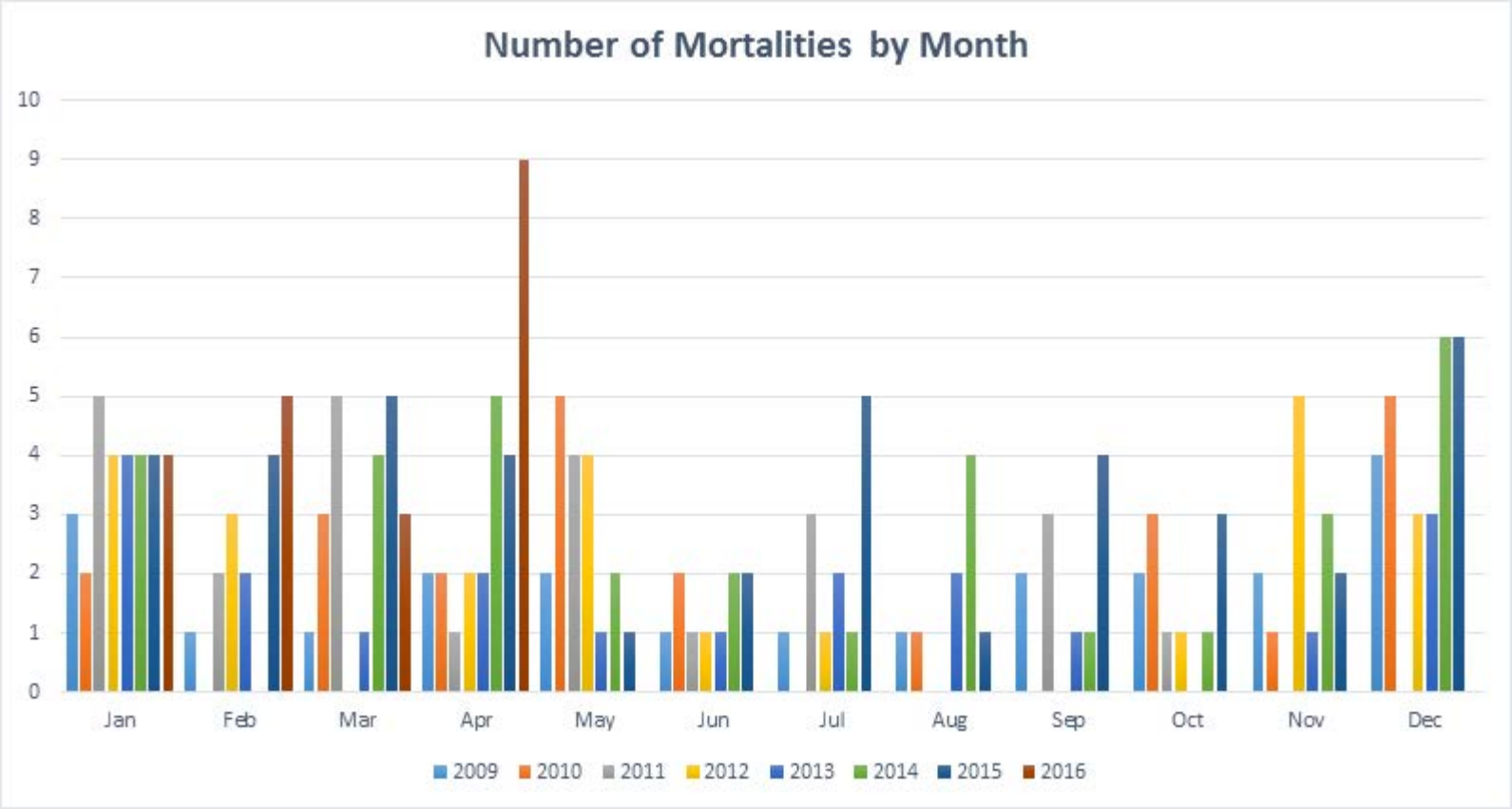
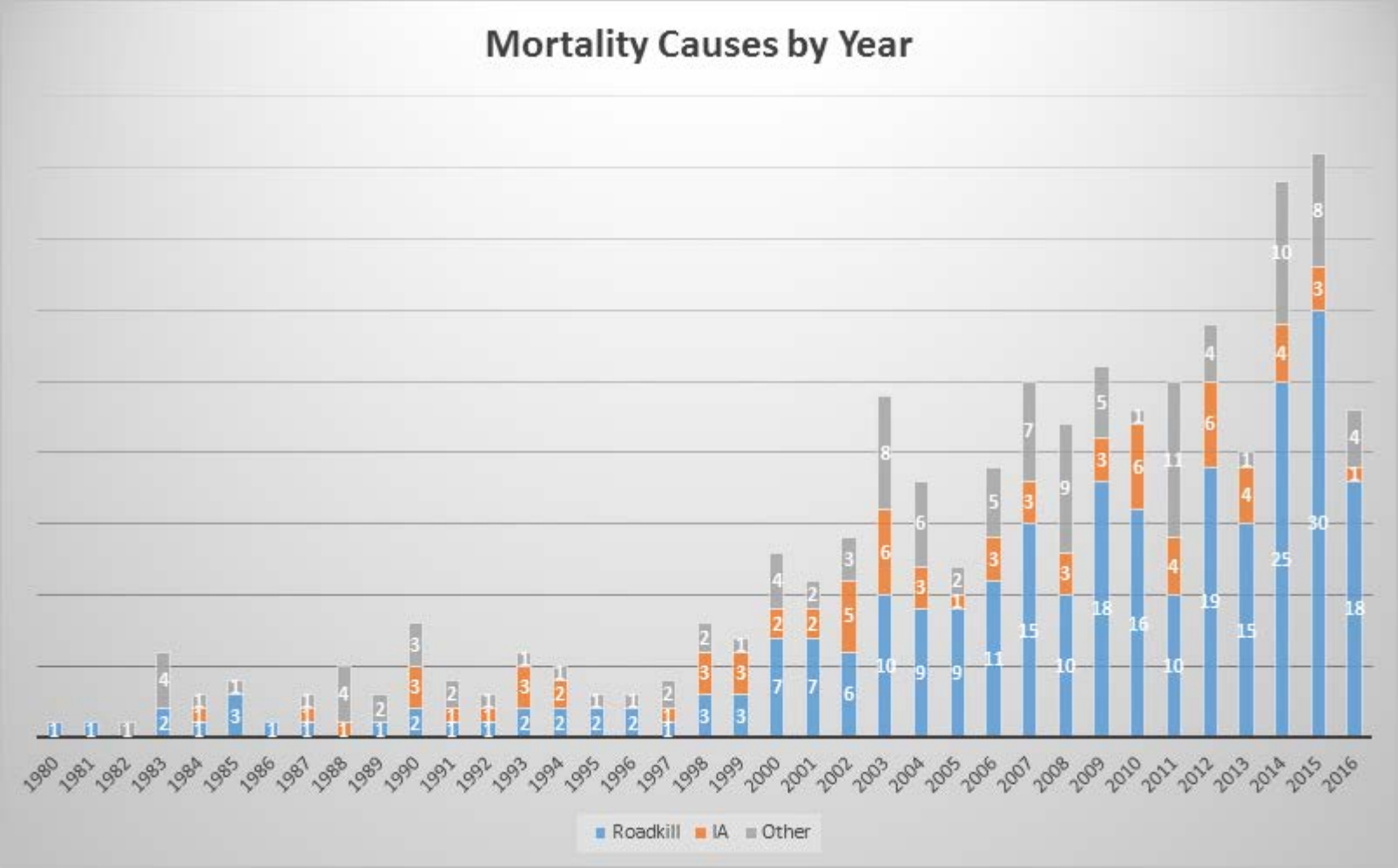

Number of Mortalities by Month
10
9
8
7
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2009
2010
2011
2012
2013
2014
2015
2016


Mortality Causes by Year
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016
Roadkill
IA
Other

From:	amber crooks
To:	Roberts, Melissa
Cc:	jennifer hecker; Layman, Laura; "Allman, Karyn"; "psutitarnnontr@sfwmd.org"; BrownAraqueSummer; "Cassler, Constance"; "Schulz, Mark"; Marissa Kruger (Marissa.Kruger@myfwc.com)
Subject:	Conservancy of Southwest Florida letter re Rural Lands West
Date:	Tuesday, August 02, 2016 10:49:20 AM
Attachments:	8-2-16 SFWMD re Rural Lands West.pdf

Hello,

Please see the attached Conservancy of Southwest Florida comment letter regarding the Rural Lands West (FKA Town of Big Cypress) application to the South Florida Water Management District.

Thank you for considering our input. If you have any questions or would like to discuss further, please feel free to contact us. The referenced enclosed letters will be sent under separate cover due to size restrictions.

Sincerely,

Amber Crooks
Amber Crooks, Senior Natural Resources Specialist
Conservancy of Southwest Florida
1495 Smith Preserve Way
Naples, FL 34102
(239)262-0304 ext. 286
amberc@conservancy.org
www.conservancy.org

CONSERVANCY of Southwest Florida
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Please consider the environment before printing this e-mail

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OUR WATER, LAND, WILDLIFE, FUTURE.

Protecting Southwest Florida's unique natural environment and quality of life ... now and forever.

August 2, 2016

Melissa Roberts, Administrator
South Florida Water Management District
2301 McGregor Blvd.
Ft. Myers, FL 33901

RE: Rural Lands West (FKA Town of Big Cypress), ERP Application #160711-8

Dear Ms. Roberts:

The Conservancy of Southwest Florida writes on behalf of our over 6,000 supporting families regarding the proposed Rural Lands West development (application #160711-8, formerly known as Town of Big Cypress #080103-6).

The Conservancy has been tracking development on these lands for over eight years and appreciates the opportunity to provide input on this proposal. We would like to incorporate our prior "Town of Big Cypress" comment letters and verbal comments relayed at monthly Regulatory Meetings with this letter, as many of those same concerns and questions still apply to the project now identified as Rural Lands West.

For the reasons expressed below, the current proposal for Rural Lands West -like Town of Big Cypress before it- fails to meet the criteria for permit issuance under rule 62-330 F.A.C., Applicant's Handbook Volume I and II. Thus, the requested permit should not be granted.

I. Rural Lands West Adversely Impacts Wildlife and its Habitat

The Environmental Resource Permit (ERP) rule and handbooks stipulate that proposed activities cannot adversely impact fish and wildlife wetland habitat functions.[1] This includes impacts to the abundance and diversity of listed species, or the habitat of those species.[2]

The project, due to inadequate surveying, lack of avoidance and minimization, and inconsistency with species recovery plans and management plans, does not meet requirements under rule. Further, the applicant is not able to provide the necessary reasonable assurances

[1] Applicant's Handbook, Vol. I, Section 10.1.1.
[2] Applicant's Handbook, Vol. I, Section 10.2.2.

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required under rule until the US Fish and Wildlife Service completes its review of the proposed Eastern Collier Habitat Conservation Plan which has a nexus with the Rural Lands West project.

Inadequate Surveying of Listed Species

The provided surveys confirm that over a dozen state and federally listed species currently utilize the site, including lands within the impact area. However, there are significant gaps in the applicant's surveying.

Surveys Needed During Permit Review and at Pre-Construction
We appreciate that the applicant agrees to conduct pre-construction surveys for the caracara up to 4,920 feet from the impact area, prior to any construction activities.[3] However this kind of information is needed both at time of permitting and at time of construction to provide adequate avoidance and minimization of impacts to this and other wetland-dependent species.

There are several species that need buffer zones (e.g. crested caracara at 4,920 feet, bald eagle at 660 feet, Big Cypress fox squirrel nest at 125 feet, sandhill crane nest at 400-1,500 feet, etc.). The applicant should extend their updated surveys to include lands east of the impacted area – currently missing from the 2014-2016 surveys- up to an adequate distance to determine if any of the buffer zones for listed species falls within the proposed impact area.

Using Up-to-date Survey Techniques
The applicant should also resurvey for the Florida bonneted bat. The applicant is relying on bat surveys from 2007, however best practices have been updated in recent years regarding the types of habitats, length of survey, and time of day to survey (e.g. survey should be conducted all night long, temperature is 60 degrees or warmer, 2-night survey replicated three times, detectors at 10-30 feet above ground,[4] potential tree cavities peeped[5]). Thus, a new bonneted bat survey is needed.

Presuming Presence for Cryptic Species
Detecting the presence of some species is difficult. Relying on walking surveys for the eastern indigo snake species may result in false negative results, particularly in south Florida where they are known to utilize manmade refugia, as well as burrows from other species. New studies have found that indigo snakes and canal/ditch habitat are positively correlated[6]; given the amount of canal/ditch area that exists on the site, the applicant must do more to avoid, minimize, and mitigate impacts to the indigo snake in addition to just implementing the Standard Protection Measures.

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[3] Rural Lands West, July 2016.Listed Species Management and Human-Wildlife Coexistence Plan. P. 11.
[4] Holly Ober, 2015. Presentation to Southwest Florida Association of Environmental Professionals, July 17, 2015.
[5] Tropical Environmental Consultants, 2014. Cavity Survey Florida Bonneted Bat.
[6] Jackson, S., 2013. Home Range Size and Habitat Use of the Eastern Indigo Snake at a Disturbed Agricultural Site in South Florida: A Thesis Presented to Florida Gulf Coast University.

The applicant should also address surveying for the Everglades mink, which are documented to occur south of the project in the Fakahatchee Strand, as a state-imperiled species. Since surveying is also difficult for these species, presence may need to be assumed, triggering implementation of minimization and mitigation measures.

Missing Information

We ask that a survey for the Southeast American kestrel be completed, following the Beever guidelines,[7] as this species does not appear to be specifically addressed in the applicant's materials.

Additionally, the applicant's information does not indicate whether or not flightless young were detected for any of the wetland bird species observed. For example, a nest should be presumed if flightless limpkins or sandhill cranes are present.[8] Further, although the applicant's materials note that stick nests were observed, the surveyors did not do any further study to determine if they belonged to the protected Big Cypress fox squirrel, even though this species was observed during the survey.[9]

One of the most concerning gaps of information is regarding missing survey transects within Conservation Area 24 at the south end of the project site. The transects shown on Appendix D of the Listed Species Survey Report shows a gap in surveying for about a thousand foot by thousand foot area (see Exhibit A).[10] This area needs additional and refined surveying as it is in close proximity to a prior caracara nest that was documented within the project area in 2009 (see Exhibit B), but believed to have been destroyed by raccoons that same year.[11] Prior nesting season surveys have also shown additional caracara observations, flight patterns, and perch trees within this missing area not covered during the 2014 survey (see Exhibit C). Caracaras have strong site fidelity and may have two to three alternate nests, typically within 0.3 mile of each other.[12] Thus this area needs to be reexamined, given the frequency of sightings and history of the site.

<u>Failure to Avoid and Minimize Impacts to Listed Species Habitats</u>

The applicant states that the ecological value of the areas to be impacted by the project is low, and that reduction of wetland impacts, in particular, is not required because of the proposed mitigation.[13]

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[7] Beever, 2006. Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects. p. 13-14.

[8] Beever, 2006. Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects. p. 6.

[9] Rural Lands West, 2016. Listed Species Survey Report, July 2016, P. 8.

[10] Rural Lands West, 2016. Listed Species Survey Report, July 2016, Appendix D. Aerial with Survey Transect Locations (2014-2016 surveys).

[11] Rural Lands West, 2016. Listed Species Survey Report, July 2016, P. 2.

[12] Morrison, 2001. *Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara in Florida, Technical Report No. 18* (produced for the Florida Fish and Wildlife Conservation Commission).

[13] Rural Lands West, 2016. Environmental Supplement for South Florida Water Management District Environmental Resource Permit. P. 13-14.

However, the project area contains some of the most important upland and wetland habitats for several species, especially the Florida panther. Mitigation should be considered *only after* the applicant has adequately made all practicable modifications to eliminate or reduce impacts, as per the ERP rule.[14]

Florida Panther Habitat Critical to Survival and Recovery Would be Lost

The US Fish and Wildlife Service has established the Kautz et al. 2006[15] study as a best available science in the conservation of the Florida panther and recognizes the Primary Zone habitat as the highest priority habitat.[16] The Primary Zone is the minimum "space to support a population that is barely viable demographically as long as the habitat base remains stable,"[17] thus regulatory agencies should strive to maintain a "no net loss of landscape function or carrying capacity."[18] The Panther Recovery Plan reinforces this science in stating that "to prevent further loss of population viability, habitat conservation efforts should focus on maintaining the total available area, quality, and spatial extent of habitat within the Primary Zone."[19]

However, the Rural Lands West project equates to a loss in over 3,000 acres of Primary Zone habitat (see Exhibit D). Panther telemetry has been documented both adjacent to and within the project impact area (see Exhibit E), as panthers utilize agricultural lands as part of their habitat matrix.[20] These areas also provide the edge habitat and prey sources, and was recognized in the modeling of the Primary Zone which knowingly includes "other natural and non-urban disturbed land cover types between forest patches that serve[] as landscape connections that accommodate panther home range and dispersal movements[21]."

Technical review of this area of Collier County by six of the most well-known panther biologists -the Panther Review Team- resulted in the recommendation to move development away from the Primary Zone to areas in the Secondary Zone first.[22] The PRT report also recommended areas of preservation to buffer the Camp Keais Strand, some of which falls within the revised project (see Exhibit F). They also acknowledged that if the Rural Lands West project (then

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[14] Applicant's Handbook, Vol. I, Section 10.2.1 and 10.3. In this letter, the Conservancy uses eliminate/reduce as synonyms to avoid/minimize.

[15] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133.

[16] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision.

[17] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 129.

[18] *Ibid*. p. 118.

[19] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 89.

[20] Land, et al, 2008. Florida panther habitat selection analysis of concurrent GPS and VHF telemetry data. *Journal of Wildlife Management* 72(3): 633-639. p. 637.

[21] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 122.

[22] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 29. "Future development [should] occur [ ] first in Open Lands that are within the Secondary Zone before lands within the Primary Zone are considered for conversion to urban uses."

known as Town of Big Cypress) were to be fully assessed by the team they would have recommended additional preserve areas.[23]

And finally, even the newest panther science, Frakes et al., 2015,[24] emphasizes the importance of maintaining the lands within the project from intensification. Covering a similar area of the project and project impact area as the Primary Zone (see Exhibit G), the Frakes "Adult Breeding Habitat" Zone is also "essential to the survival and recovery of the subspecies and should receive the highest priority [for conservation] by regulatory agencies."[25]

Other Impacts to Florida Panther that Threaten Survival and Recovery
In addition to the direct loss of panther habitat through development, the Rural Lands West project will adversely affect the prey base, result in an increase of roadkills from traffic, provide for unsustainable human-wildlife conflicts, and infringe upon a significant regional corridor.

Information shared during the Town of Big Cypress application process revealed that the site provides a good base for deer, one of the panther's major prey items.[26] Further, the Rural Lands West project lies in the heart of 'panther country', with 70 roadkills having occurred within a 25-mile radius to the project by 2008.[27] Additional roadkills in the vicinity of the project have occurred since that time, and are likely to increase based on traffic from 10,000 new residences that this project will generate. Intensifying human presence in this currently-rural area will also have other implications: negative human-wildlife interactions will likely increase. Lake buffer systems and fencing is proposed as a wildlife deterrent, but bears and panthers are known to swim (see Exhibit H), and there are significant gaps along the western side- adjacent to the Golden Gate Estates area where there are already conflicts between large mammals and humans.

The Rural Lands West project may also threaten the integrity of the Camp Keais Strand as the "only landscape linkage connecting the Florida Panther National Wildlife Refuge to the CREW lands[28]." Telemetry records show that panthers are utilizing both native land covers and agricultural land covers within the Camp Keais and Shaggy Cypress systems, effectively using the entire project boundary area as a thoroughfare.

Through direct and indirect impacts from a human presence, lighting, noise, and other disturbance factors, the Rural Lands West project will contribute to habitat fragmentation and

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[23] Florida Panther Protection Program Technical Review Team, 2009. Email from David Shindle to PRT. January 8, 2009. "Regardless of the conservation measures proposed to mitigate habitat loss under the existing town proposal, if the DRI boundary did not exist, additional areas of preservation would have been recommended for that area based on our criteria."
[24] Frakes, et al., 2015. Landscape Analysis of Adult Florida Panther Habitat. PLoS ONE 10(7): e0133044.
[25] *Ibid.* P. 15.
[26] Passarella & Associates, 2009. Town of Big Cypress Biological Assessment June 2009. Prepared by Passarella & Associates for Collier Enterprises Management, Inc. P. 9.
27 Passarella & Associates, June 2009. Town of Big Cypress Biological Assessment June 2009. Prepared by Passarella & Associates for Collier Enterprises Management, Inc. Exhibit 32.
28 Smith et al, 2006. East Collier County Wildlife Movement Study: SR29, CR846, and CR858 Wildlife Crossing Project. Unpublished Report. University of Central Florida, Orlando, FL. P. 58.

degradation of one of the most important corridors for the Florida panther. Any loss in corridor function could exacerbate the confinement of panthers in south Florida, leading to an increase in road mortality and intraspecific aggression. In addition to the preservation areas recommended by the PRT (see Exhibit F), Smith et al., 2006 also identified this area as worthy of restoration, necessary to retain upland buffers and the functionality of the Strand as a wildlife corridor (see Exhibit I).[29]

Impacts to Crested Caracara Have Not Been Avoided and Minimized

As mentioned above, there has been a significant amount of caracara activity on the site. An active nest has been located just north of the project boundary. The US Fish and Wildlife Service has established a Primary Zone (985 feet from the nest) and Secondary Zone (4,920 feet from the nest) for protection of the caracara.[30] The applicant should limit development impacts within the entirety of these buffers. Further, the Service recommends the off-site areas "should be protected through conservation easements," and additional conservation measures should be taken on-site that are not reflected in the proposal.[31]

Impacts to Bald Eagle Have Not Been Avoided and Minimized

Similarly, there is an active bald eagle identified within the area to be impacted. The US Fish and Wildlife Service and the Florida Fish and Conservation Commission have established a Primary Zone (330 feet from the nest) and Secondary Zone (660 feet from the nest) for the protection of bald eagles.[32] The applicant should limit development within the entirety of these buffers.

Impacts to Wetland-Dependent Species, Including the Wood Stork

The Rural Lands West project will directly impact 280.77 acres of wetlands, 15.65 acres of Other Surface Waters (OSW)[33], and will indirectly impact several hundred additional acres of wetlands in the internal Conservation Areas, which will be restricted from access by all wetland-dependent species or will be degraded from adjacent intense urban development.

The loss of wetlands and OSWs will also greatly impact imperiled wetland birds –nearly a dozen, including the threatened wood stork. Further, as the impact area may be flooded during certain times of the year, lands within the impact area are considered some of the best and most diverse bird watching habitat in Collier County, with over 100 species documented in this hotspot.[34]

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[29] *Ibid.*
[30] US Fish and Wildlife (2001). Species Conservation Guidelines South Florida Audubon's Crested Caracara. South Florida Ecological Services.
[31] US Fish and Wildlife (2001). Species Conservation Guidelines South Florida Audubon's Crested Caracara. South Florida Ecological Services. p. 7.
[32] Florida Fish and Wildlife Conservation Commission, 2008. Bald Eagle Management Plan.
[33] Rural Lands West, 2016. Application Section C, Supplemental Information.
[34] Gargiulo Farms. Ebird.org, Hotspots. Accessed December 7, 2015.

Alternate Footprint is Necessary

Given the sensitivity and critically-important nature to habitats within the current proposal, an alternate footprint is needed. The Conservancy plans to provide our vision map in the near future, which will seek to move development away from the most important panther habitats, as well as minimize impacts to the bald eagle and caracara. The applicant owns lands outside of the project boundary to the north that may be more suitable for development. As per the ERP rule, "design modifications to reduce or eliminate adverse impacts must be explored."[35]

If the applicant fails to evaluate these lands as an alternative due to intended future development of these lands (which are included in the envelope of development seeking a federal wildlife permit currently),[36] the District should consider those plans as additional phases of the Rural Lands West project. Per the ERP rules at 10.2.7, "activity expansions and future activity phases will be considered in the secondary impact analysis. If the Agency determines that future phases of an activity involve impacts that appear not to meet permitting criteria, the current application shall be denied unless the applicant can provide reasonable assurance that those future phases can comply with permitting criteria. One way for applicants to establish that future phases or system expansions do not have adverse secondary impacts is for the applicant to obtain a conceptual approval permit for the entire project."[37]

Results of Eastern Collier HCP EIS Necessary for Reasonable Assurance

As defined by the US Fish and Wildlife Service, jeopardy means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species[38]." As the Primary Zone supports the only known breeding population unit of the Florida panther, "any loss of reproductive capability... can represent jeopardy because the survival of the entire species is significantly impaired[39]." The Service is currently reviewing a proposal by this applicant and other landowners to develop 45,000 acres of mines and development, including the Rural Lands West site (see Exhibit J), through the Eastern Collier Habitat Conservation Plan (HCP).[40] Part of their review will include an Environmental Impact Statement (EIS) under the National Environmental Policy Act, as well as review of the project under the Endangered Species Act, including an assessment of whether the proposal will jeopardize the panther or any of the other listed species in this area. In order to provide the necessary assurances under the ERP rules, the District should wait until the Service completes its process.

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[35] Applicant's Handbook, Vol. I, Section 10.2.1.
[36] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services.
[37] Applicant's Handbook, Vol. I, Section 10.2.7.
[38] US Fish and Wildlife Service, 1998. Endangered Species Act Section 7 Consultation Handbook. P. 4-33.
[39] US Fish and Wildlife Service, 1998. Endangered Species Act Section 7 Consultation Handbook. P. 4-37. Guidance provided in the handbook establishes this policy.
[40] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services.

II. Concerns Regarding Rural Lands West Mitigation Proposal

Complex History of the Site Leaves Too Much Room for Error

The applicants are proposing different mitigation packages for the Collier County process than what is directly being proposed for mitigation to the District.[41] In example, the boundary of the Stewardship Sending Areas (SSA) proposed for the District has slightly different boundaries than those seen on the Collier County application. Additionally, the history of the site also involves past several different agricultural and roadway permits. It is critical that the District take every opportunity to review these differences and ensure that mitigation that already offsets prior and ongoing impacts is not utilized for the Rural Lands West new impacts.

Continued Uses Within the SSAs Should Be Reflected in the UMAM Analysis

Please note that under the SSA15 agreement, about 5,200 acres of the area is being retained for continued agricultural and ag support uses. This means all types of agricultural uses –from crops to pasture, as well as housing for farm laborers- are still acceptable and anticipated on those lands, within the terms of the SSA. Further, it appears that part of the intended SSA17 in the northwest section of the property will actually be incorporated as part of the stormwater lake system. These uses, and the potential for increased use or conversion, should be reflected and only an appropriate mitigation credit value be granted for these lands.

Use of Uplands as Mitigation Is Not Appropriate

According to the applicant's materials, of the 3,601.48 acres that are proposed as compensatory mitigation for impacts to jurisdictional wetlands, 3,355.70 acres are wetlands.[42] The remaining 245.78 acres are from preservation of uplands and upland restoration.[43] While these lands may have an environmental significance, in general it is not appropriate to utilize uplands to mitigate wetlands. As uplands, they may not be able to provide a true functional match for the wetlands that are being impacted either for floodplain protection, water quality, hydroperiod considerations, or as wetland species habitats. Thus, we ask that the applicant provide additional wetland mitigation, along with wetland avoidance and minimization.

Urban Use Proposal is Inconsistent with Preserve Management

The applicant states that they 'may' use prescribed fire to maintain preserves.[44] However, it is our understanding that the proposed development includes medical facilities, which may limit

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[41] The applicant acknowledges that some restoration will be completed for the Collier County process but not for the District. Rural Lands West, 2016. Environmental Supplement for South Florida Water Management District Environmental Resource Permit. P. 16.
[42] Rural Lands West, 2016. Environmental Supplement for South Florida Water Management District Environmental Resource Permit. P. 18.
[43] *Ibid.* P. 19.
[44] Rural Lands West, 2016. Listed Species Management and Human-Wildlife Coexistence Plan. July 2016. P. 6.

the future use of prescribed fire even with smoke easements in place. The conflict between urban development and land management was emphasized in comments from the Florida Panther National Wildlife Refuge staff in their prior comments about the Town of Big Cypress[45] and about the Eastern Collier HCP.[46] Without use of prescribed fire in the region, the project may contribute to unacceptable cumulative impacts - not just to the areas it proposes as mitigation for impacts, but also to other conservation lands that make up the crown jewels of the western Everglades ecosytem.

III. Concerns Regarding Impacts to Water Resources

The Applicant's Handbook Volume I states that activities must not adversely affect the quality of receiving waters, must not cause adverse secondary impacts to water resources, including the hydroperiods of wetlands.[47] In the Conservancy's prior letters to the District, dated May 13, 2009 and September 24, 2009, we raised many concerns in regards to protection of water resources that may still be applicable to the Rural Lands West proposal and should be reviewed carefully.

Concerns Regarding Hydroperiod Alteration and Floodplain Compensation

The Rural Lands West footprint is located within the Core Foraging Area (CFA) of several wood stork nesting colonies. Additionally, habitat for at least eight species of listed birds has been documented on the site. As these lands support the essential behavior and life functions for protected wildlife, and as miles of stormwater lakes are proposed adjacent to regionally-significant wetlands systems, it is imperative that the applicant show the proposed project will not cause an "adverse impact... caused by increasing or decreasing the depth, duration or frequency of inundation or saturation within wetlands."[48]

Regarding discharge from the stormwater system, the applicant states that Collier County Ordinance 90-10, which sets limits on discharge rates of developments, does not apply since the project is not discharging directly into the main receiving water.[49] We find no language in the County's ordinance that makes that exemption. Thus, the District should ensure that the project adheres to the most restrictive discharge rate and does not create an adverse off-site impact.

Further, the applicant states that floodplain compensation analysis is not required as the "site is currently diked and isolated from floodplain."[50] However, the site currently acts as a reservoir during certain times of the year and removal of 3,427 acres of currently pervious land cover to development[51] will surely have an impact that needs to be fully understood.

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[45] US Fish and Wildlife Service, 2010. Emails and notes regarding Town of Big Cypress, 2006
[46] US Fish and Wildlife Service, 2016. Letter to Kenneth McDonald Re: Public Comment Eastern Collier Multispecies Habitat Conservation Plan and EIS. April 25, 2016.
[47] Applicant's Handbook, Vol. I , Section 10.1.1.
[48] Applicant's Handbook, Vol. I, Section 10.2.2.4.
[49] Rural Lands West, 2016. Conceptual Water Management Report. P. 5.
[50] Rural Lands West, 2016. Application Section E, Supplemental Information.

Concerns Regarding Water Quality

The Rural Lands West project falls within the Camp Keais Waterbody (WBID) (see Exhibit K), that is currently identified as impaired for nutrients (historic chlorophyll-a). However, on the applicant's materials, when asked if the receiving body is impaired, the applicant did not acknowledge the presence of the impaired waterbody.[52] The application references that discharge will be into the Camp Keais Strand[53], and the current agricultural permits reference discharge into Stumpy Strand and Camp Keais Strand. As the Fakahatchee Strand and Florida Panther National Wildlife Refuge contain Outstanding Florida Waters, and the receiving waters are currently impaired, we request that the applicant provide the adequate water quality treatment to ensure the project will not degrade area waters.

Concerns Regarding Consumptive Water Use

The applicant has not provided materials regarding the consumptive water use needed for this large project, which is about 2 miles wide and 6 miles long. The addition of golf courses, commercial facilities, and ten thousand additional new residences will require a large expense of water supply. In the prior application, which was of a smaller area than Rural Lands West, it was estimated that even with use of reclaimed water, the irrigation needs alone would draw over one million gallons of water a day.[54]

Further, the project currently falls within the East Golden Gate wellfield protection zone for Collier County. The proposed project will have impacts that extend far beyond the project site, as a new town in a currently rural area will also require large expenditures in available water supply, as well as the ability to recharge this precious public resource.

IV. Cumulative Impacts

The Applicant's Handbook Volume I states that activities must not have an unacceptable cumulative impact on wetlands and other surface waters. [55] As anticipated from a development of this site, "a variety of secondary and cumulative impacts from....introduction of domestic animals, fugitive lighting, fertilizers, oils and greases, stormwater management systems changing hydro-patterns, introduction of exotic landscaping plants, yard waste dumping, mosquito control and other pesticides, etc., will result."[56] There will also be cumulative impacts to the function of off-site wetlands due to disturbance to wetland-dependent species, as detailed in the sections above. It is also foreseeable that a project of this size will require

---

[51] Rural Lands West, 2016. Conceptual Water Management Report.
[52] Rural Lands West, 2016. Application Section E, Supplemental Information.
[53] Rural Lands West, 2016. Application Section A, Supplemental Information.
[54] RAI Response Water Supply Impact Assessment provided by applicant.
[55] Applicant's Handbook, Vol. I , Section 10.2.8.
[56] Southwest Florida Regional Planning Council letter, 1st Sufficiency RAI Questions, by Jim Beever.

additional public infrastructure and transportation projects to fully service the new town. These types of cumulative impacts are likely to be severe, given the setting of the proposed project.

Conclusion

The project, now grown from approximately 3,700 acres of impact to about 4,600 acres of impact, does not meet the ERP rules and Applicant's Handbook. The application fails to provide reasonable assurances that water resources, wetlands, and wildlife habitat will be properly protected. These impacts, along with cumulative impacts, show that this project is not in the public interest, and should be denied.[57]

We would like to reserve the ability to provide additional comments on this application in the future. Thank you for consideration on this matter. If you have any questions regarding our letter, please feel free to call at (239) 262-0304 ext. 286.

Sincerely,

Amber Crooks
Senior Natural Resources Specialist

Cc: Jennifer Hecker, Conservancy of Southwest Florida
Laura Layman, SFWMD
Karyn Allman, SFWMD
Pakorn Sutitarnnontr, SFWMD
Summer Araque Brown, Collier County
Connie Cassler, USFWS
Mark Schulz, FWC
Marissa Krueger, FWC

Encl: Conservancy of Southwest Florida letter re draft Eastern Collier HCP
Conservancy of Southwest Florida letters re Town of Big Cypress

[57] Applicant's Handbook, Vol. I , Section 10.1.1.

Exhibit A

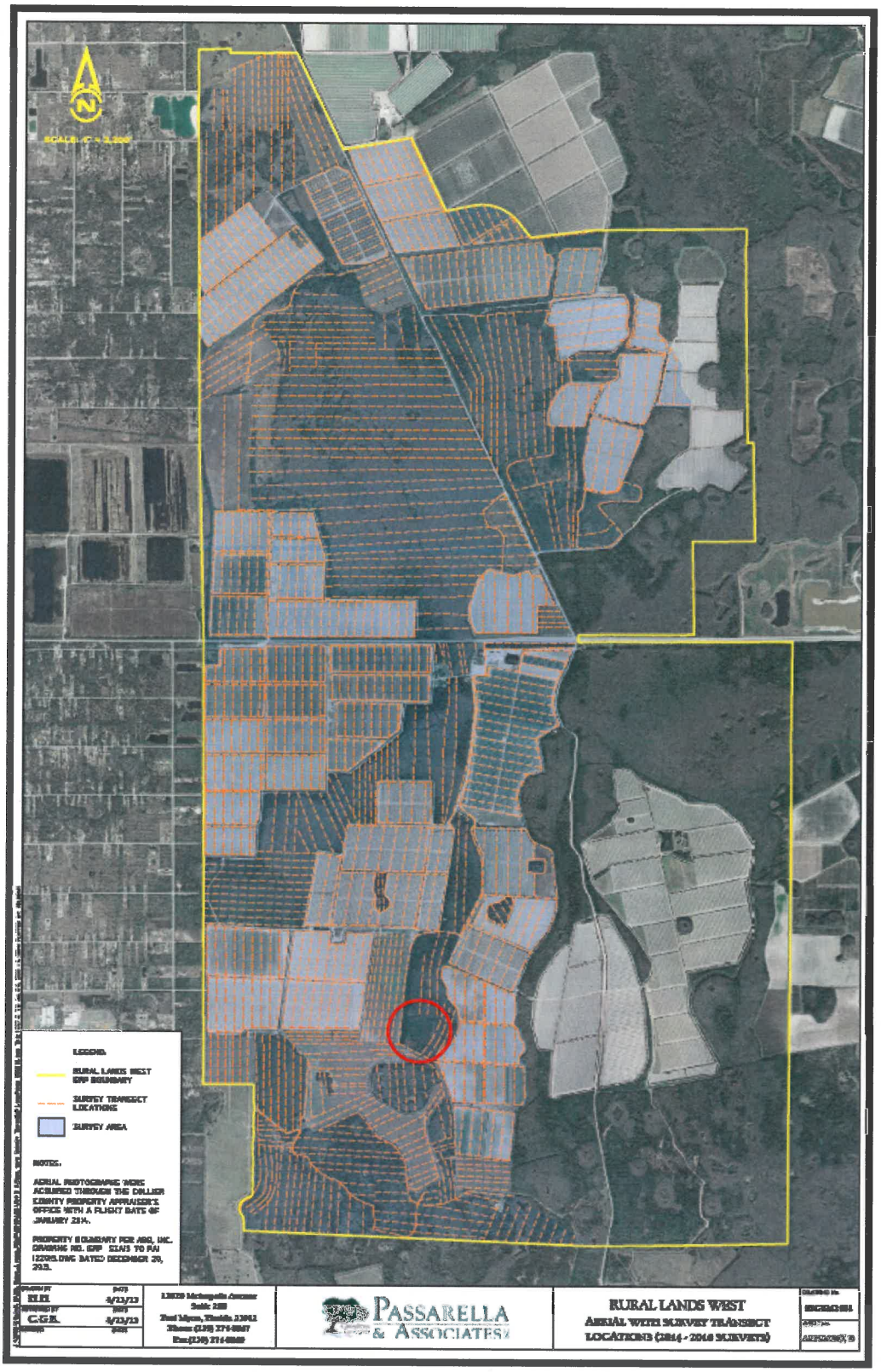

LEGEND
RURAL LANDS WEST ERP BOUNDARY
SURVEY TRANSECT LOCATIONS
SURVEY AREA
NOTES:
AERIAL PHOTOGRAPHS WERE ACQUIRED THROUGH THE COLLIER COUNTY PROPERTY APPRAISER'S OFFICE WITH A FLIGHT DATE OF JANUARY 2014.
PROPERTY BOUNDARY PER ARD, INC. DRAWING NO. ERP SIA03 TO FAU 12205.DWG DATED DECEMBER 20, 2013.
PASSARELLA & ASSOCIATES
RURAL LANDS WEST
AERIAL WITH SURVEY TRANSECT LOCATIONS (2014 - 2016 SURVEYS)

Exhibit B

Exhibit C

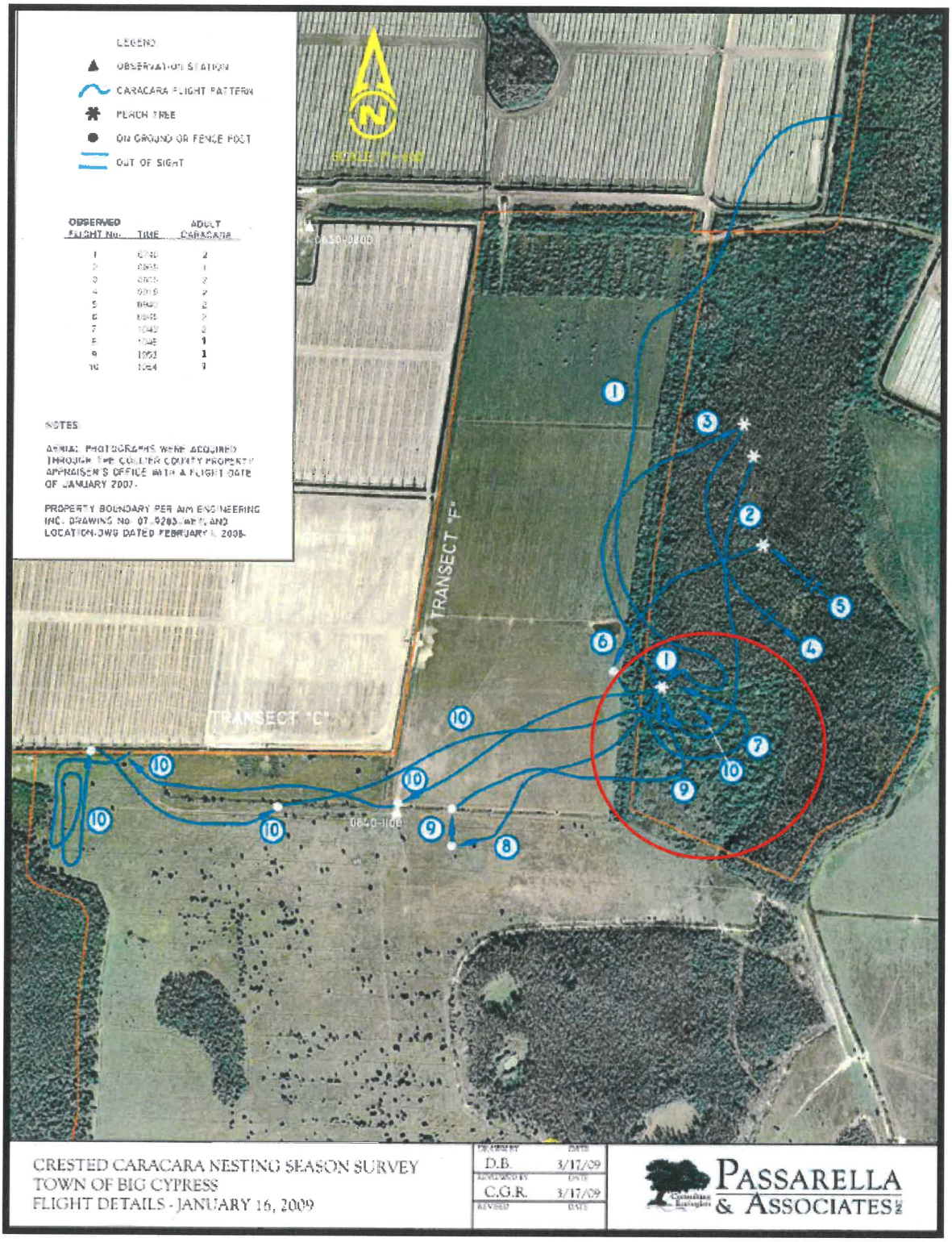

LEGEND
OBSERVATION STATION
CARACARA FLIGHT PATTERN
PEACH TREE
ON GROUND OR FENCE POST
OUT OF SIGHT
OBSERVED FLIGHT No.
TIME
ADULT CARACARA
NOTES
AERIAL PHOTOGRAPHS WERE ACQUIRED THROUGH THE COLLIER COUNTY PROPERTY APPRAISER'S OFFICE WITH A FLIGHT DATE OF JANUARY 2007.
PROPERTY BOUNDARY PER AIM ENGINEERING INC. DRAWING NO. 07-9263-MP1, AND LOCATION.DWG DATED FEBRUARY 6, 2008.
TRANSECT "F"
TRANSECT "C"
CRESTED CARACARA NESTING SEASON SURVEY
TOWN OF BIG CYPRESS
FLIGHT DETAILS - JANUARY 16, 2009
D.B. 3/17/09
C.G.R. 3/17/09
PASSARELLA & ASSOCIATES

Exhibit D

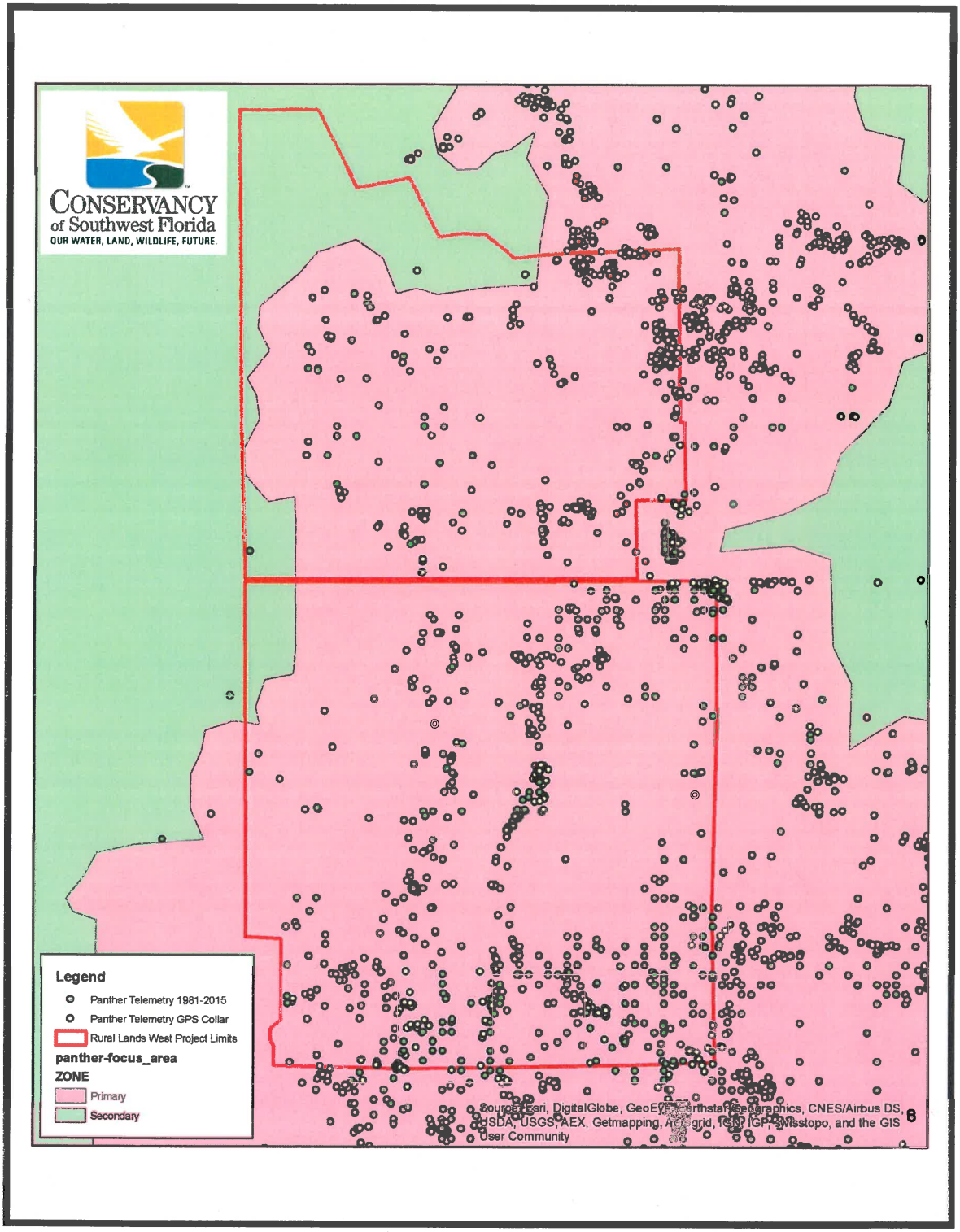

CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
Legend
Panther Telemetry 1981-2015
Panther Telemetry GPS Collar
Rural Lands West Project Limits
panther-focus_area
ZONE
Primary
Secondary
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
8

Exhibit E

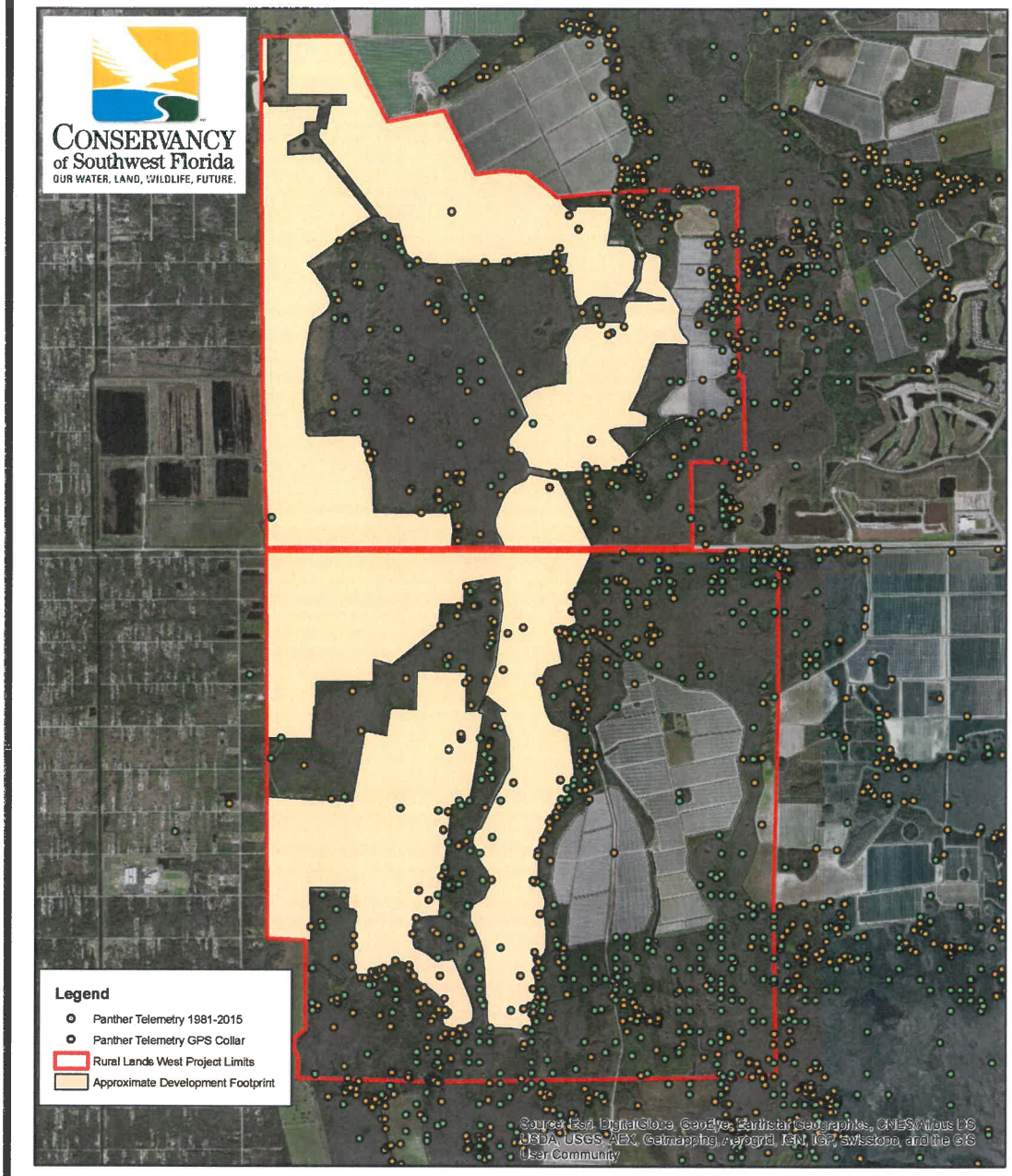

CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
Legend
Panther Telemetry 1981-2015
Panther Telemetry GPS Collar
Rural Lands West Project Limits
Approximate Development Footprint
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, Swisstopo, and the GIS User Community

Exhibit F

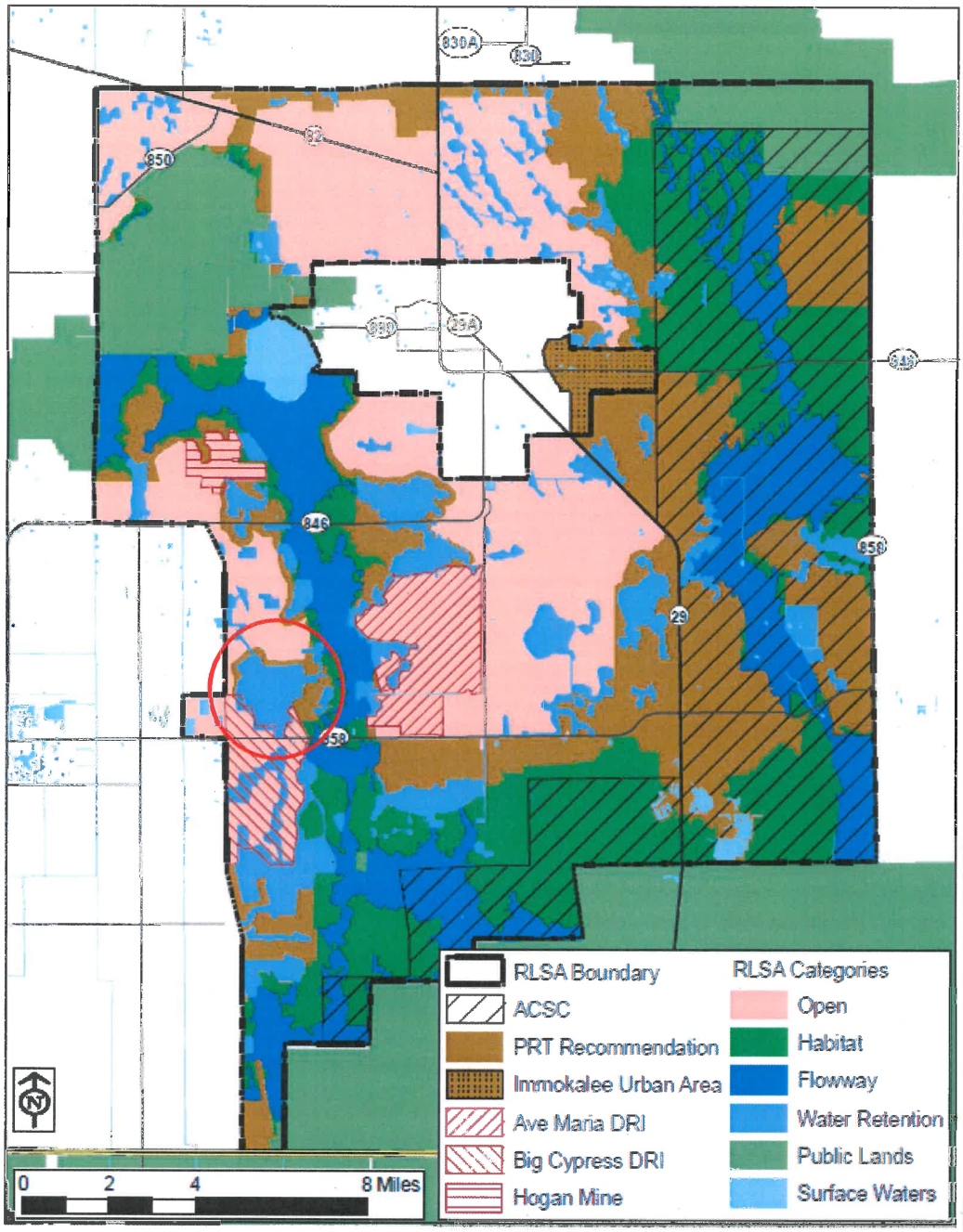


Figure 13. RLSA lands for which the Panther Review Team (PRT) recommends that land uses should be maintained at no greater than existing uses. Natural area restoration may be appropriate for some areas to enhance them as functional habitats for Florida panthers. It is the PRT's understanding that the Parties are recommending that RLSA Open Lands within the ACSC should be dedicated to Agricultural Preservation.

Exhibit G

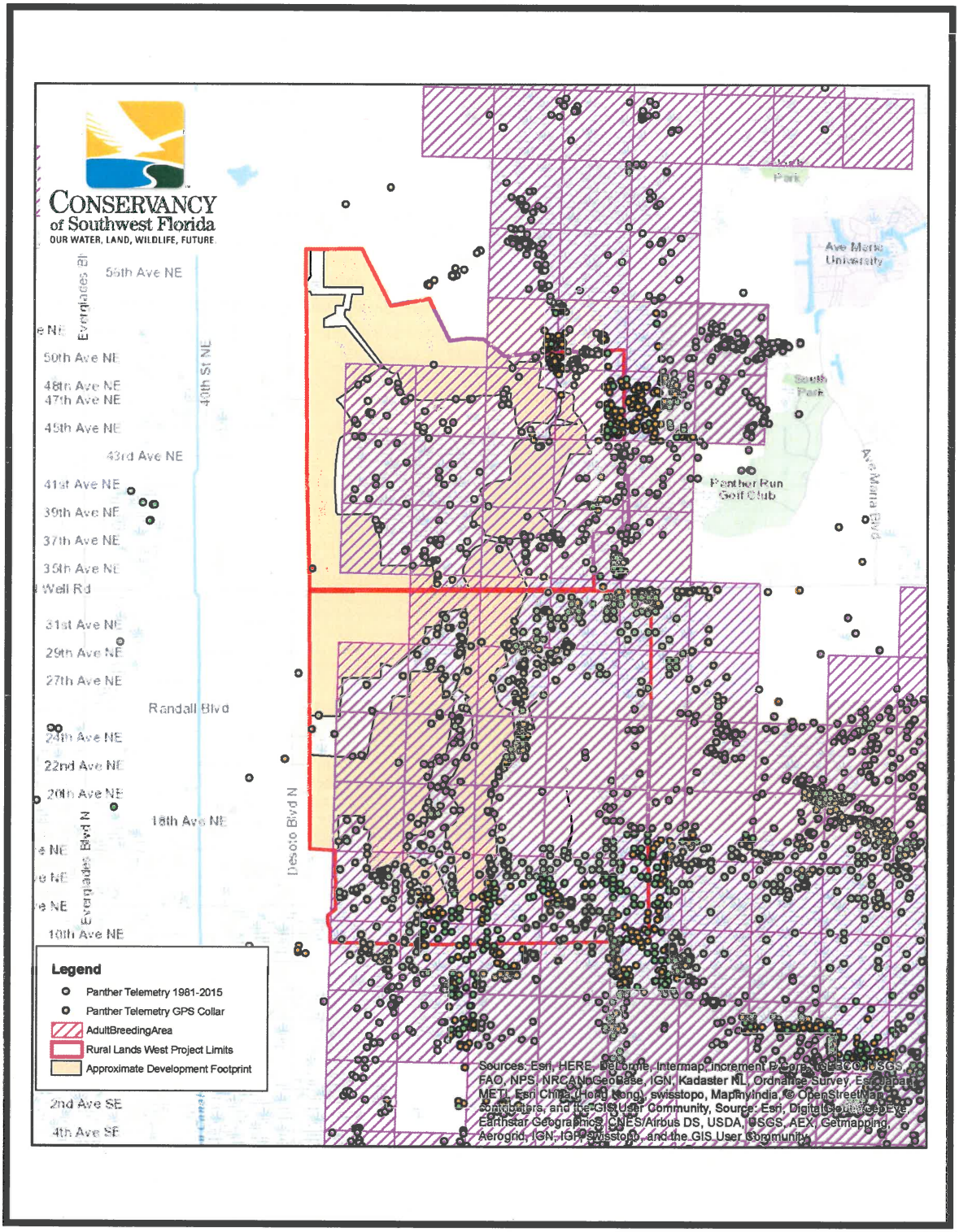

CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE
56th Ave NE
50th Ave NE
48th Ave NE
47th Ave NE
45th Ave NE
43rd Ave NE
41st Ave NE
39th Ave NE
37th Ave NE
35th Ave NE
31st Ave NE
29th Ave NE
27th Ave NE
Randall Blvd
24th Ave NE
22nd Ave NE
20th Ave NE
18th Ave NE
10th Ave NE
2nd Ave SE
4th Ave SE
Everglades Blvd N
40th St NE
Desoto Blvd N
Panther Run Golf Club
Ave Maria Blvd
Ave Maria University
Legend
Panther Telemetry 1981-2015
Panther Telemetry GPS Collar
AdultBreedingArea
Rural Lands West Project Limits
Approximate Development Footprint
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Exhibit H

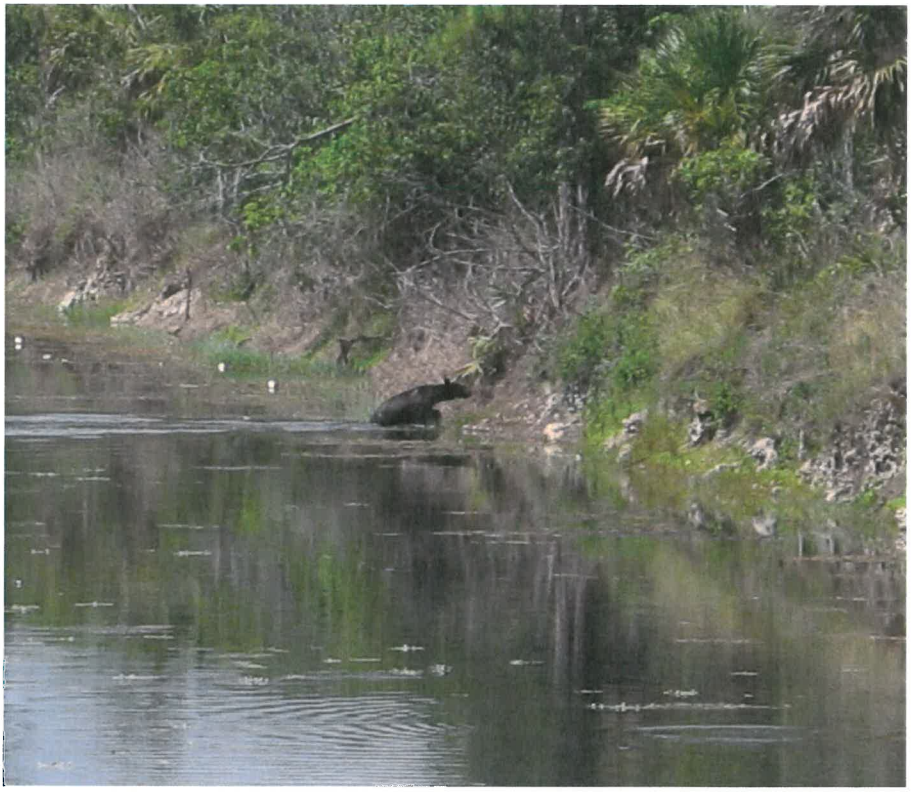


Exhibit I

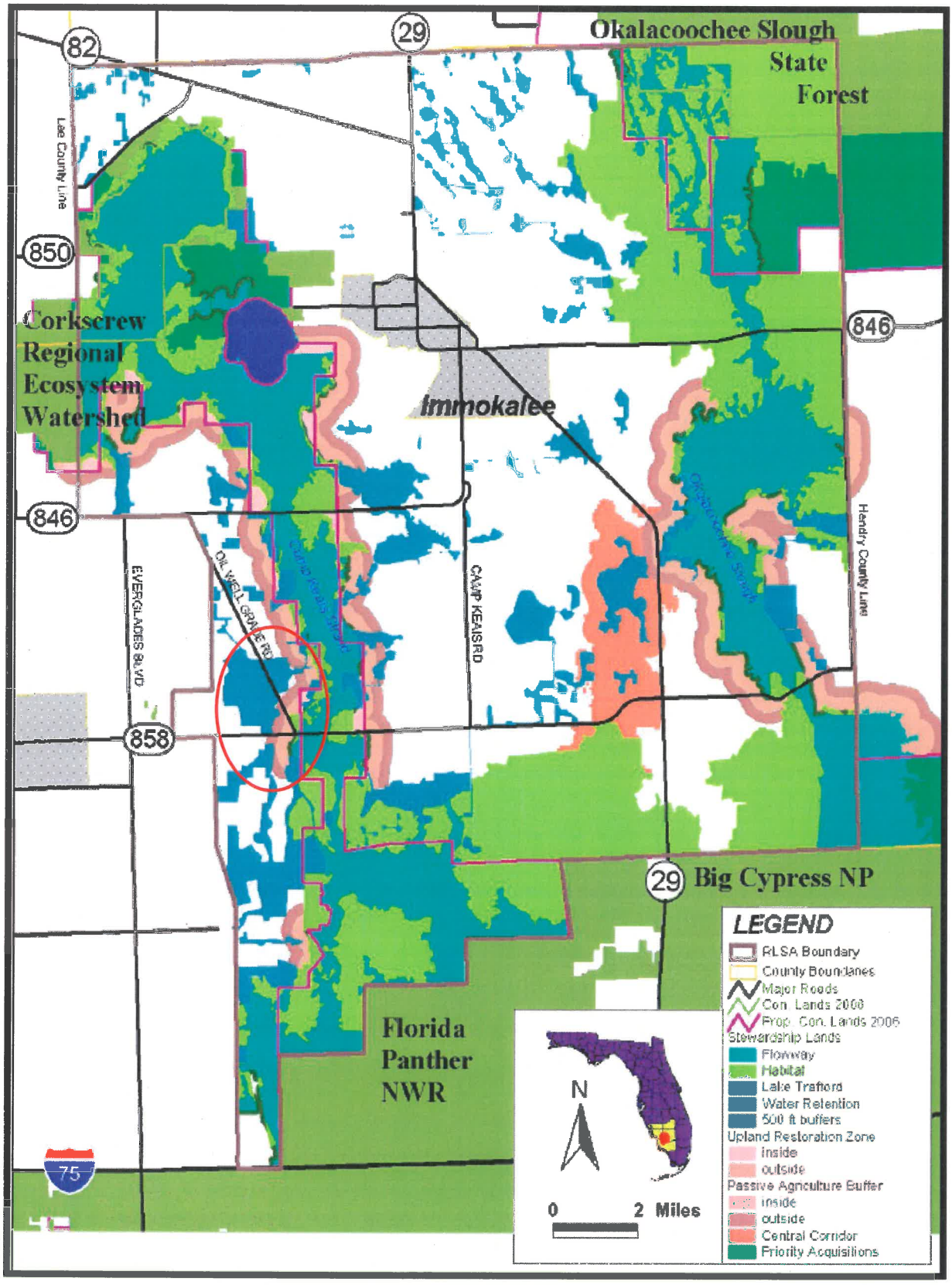

Okalacoochee Slough State Forest
Corkscrew Regional Ecosystem Watershed
Immokalee
Big Cypress NP
Florida Panther NWR
Lee County Line
Hendry County Line
EVERGLADES BLVD
OIL WELL GRADE RD
CAMP KEAIS RD
82
29
850
846
858
75
LEGEND
RLSA Boundary
County Boundaries
Major Roads
Con. Lands 2008
Prop. Con. Lands 2006
Stewardship Lands
Flowway
Habitat
Lake Trafford
Water Retention
500 ft buffers
Upland Restoration Zone
inside
outside
Passive Agriculture Buffer
inside
outside
Central Corridor
Priority Acquisitions
N
0
2 Miles

Exhibit J

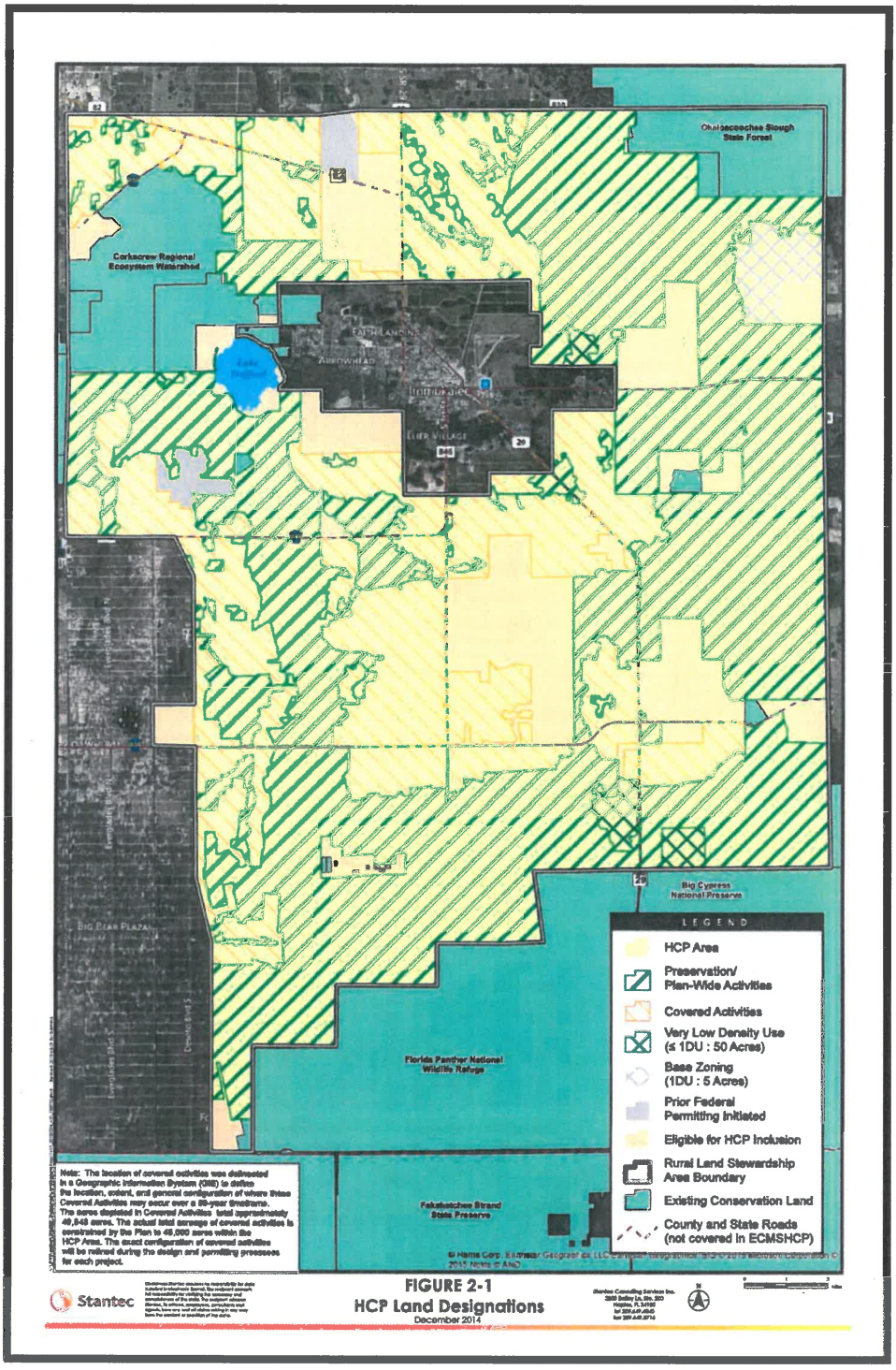
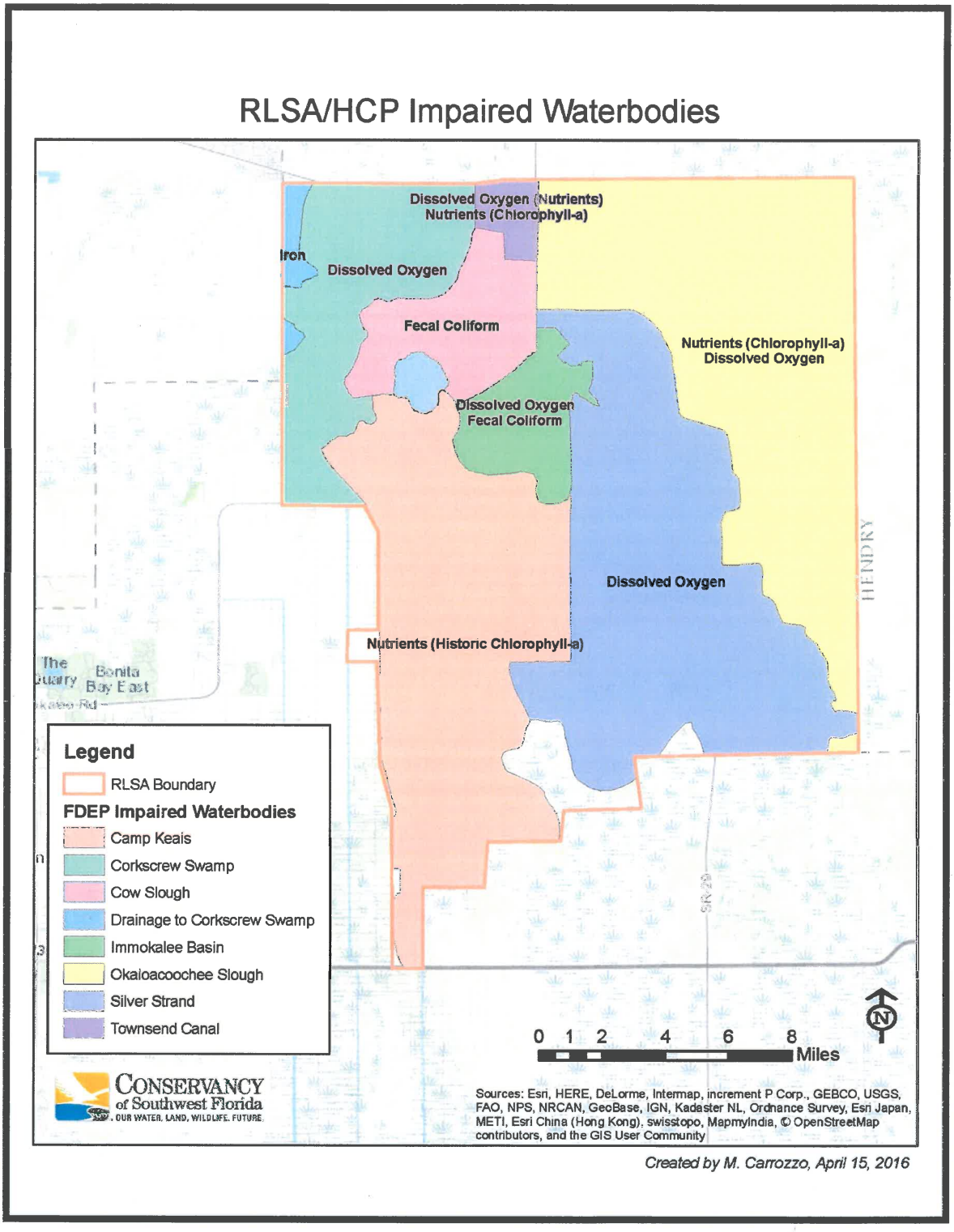


FIGURE 2-1
HCP Land Designations
December 2014

Exhibit K


RLSA/HCP Impaired Waterbodies
Dissolved Oxygen (Nutrients)
Nutrients (Chlorophyll-a)
Iron
Dissolved Oxygen
Fecal Coliform
Nutrients (Chlorophyll-a)
Dissolved Oxygen
Dissolved Oxygen
Fecal Coliform
Dissolved Oxygen
Nutrients (Historic Chlorophyll-a)
HENDRY
The Quarry
Bonita Bay East
SR 82
Legend
RLSA Boundary
FDEP Impaired Waterbodies
Camp Keais
Corkscrew Swamp
Cow Slough
Drainage to Corkscrew Swamp
Immokalee Basin
Okaloacoochee Slough
Silver Strand
Townsend Canal
0 1 2 4 6 8
Miles
N
CONSERVANCY of Southwest Florida
OUR WATER. LAND. WILDLIFE. FUTURE.
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Created by M. Carrozzo, April 15, 2016

From:	amber crooks
To:	"Roberts, Melissa"
Cc:	jennifer hecker; "Layman, Laura"; "Allman, Karyn"; "psutitarnnontr@sfwmd.org"; "BrownAraqueSummer"; "Cassler, Constance"; "Schulz, Mark"; "Marissa Kruger (Marissa.Kruger@myfwc.com)"
Subject:	RE: Conservancy of Southwest Florida letter re Rural Lands West
Date:	Tuesday, August 02, 2016 10:51:59 AM
Attachments:	Conservancy letters HCP 2016 and TOBC 2009_reduced.pdf

Please see the support materials for the Conservancy's Rural Lands West letter, attached. This includes a recent letter regarding the related Eastern Collier Habitat Conservation Plan, and two prior letters to the SFWMD for Town of Big Cypress.

Thank you,

Amber Crooks
Amber Crooks, Senior Natural Resources Specialist
Conservancy of Southwest Florida
1495 Smith Preserve Way
Naples, FL 34102
(239)262-0304 ext. 286
amberc@conservancy.org
www.conservancy.org

Protecting Southwest Florida's unique natural environment and quality of life…now and forever.

Please consider the environment before printing this e-mail

From: amber crooks
Sent: Tuesday, August 02, 2016 10:48 AM
To: Roberts, Melissa
Cc: jennifer hecker; Layman, Laura; 'Allman, Karyn'; 'psutitarnnontr@sfwmd.org'; BrownAraqueSummer; 'Cassler, Constance'; 'Schulz, Mark'; Marissa Kruger (Marissa.Kruger@myfwc.com)
Subject: Conservancy of Southwest Florida letter re Rural Lands West

Hello,

Please see the attached Conservancy of Southwest Florida comment letter regarding the Rural Lands West (FKA Town of Big Cypress) application to the South Florida Water Management District.

Thank you for considering our input. If you have any questions or would like to discuss further, please feel free to contact us. The referenced enclosed letters will be sent under separate cover due to size restrictions.

Sincerely,

Amber Crooks
Amber Crooks, Senior Natural Resources Specialist
Conservancy of Southwest Florida
1495 Smith Preserve Way
Naples, FL 34102
(239)262-0304 ext. 286
amberc@conservancy.org
www.conservancy.org

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CONSERVANCY of Southwest Florida
OUR WATER. LAND. WILDLIFE. FUTURE

April 25, 2016

Comments–Eastern Collier HCP EIS
Attn: Kenneth McDonald, Project Manager
US Fish and Wildlife Service
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559

RE: Eastern Collier Multiple Species Habitat Conservation Plan - Environmental Impact Statement Scoping and Input on Draft Plan

Dear Kenneth McDonald:

The Conservancy of Southwest Florida writes on behalf of over 6,000 supporting families in regards to scoping for the Environmental Impact Statement (EIS) being prepared for the draft Eastern Collier Multiple Species Habitat Conservation Plan (HCP).

As a long-standing active stakeholder in Florida panther conservation and recovery, we have deep concerns regarding the draft HCP. The current proposal does not meet issuance criteria[1] and runs contrary to recovery goals and best available science. The HCP does not adequately avoid, minimize, and mitigate impacts, nor does it provide a no net loss to the species for which applicants seeks incidental take coverage.

We offer the following comments regarding the draft HCP and the related National Environmental Policy Act (NEPA) EIS for your consideration and review.

I. Alternatives To Adequately Minimize Impacts to Florida Panther Must Be Considered

The HCP proposes to authorize 45,000 acres of development and mining within the plan area. The plan repeats in several sections that the HCP would direct development "toward areas of less valuable habitat."[2] However, that is inaccurate as this proposal does not avoid and minimize impacts to primary panther habitat, areas deemed to be of the highest importance and essential to the endangered Florida panther.

[1] 16 U.S.C. § 1539(a)(2)(B). 50 CFR 17.22(b)(1), 17.32(b)(1).
[2] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. i, ii.

The United States Fish and Wildlife Service (FWS) has established that Kautz et al. 2006[3] is current best available science. It guides the Florida Panther Recovery Plan[4] and FWS regulatory framework in the prioritization of panther conservation. Kautz et al. and the Recovery Plan both delineate these areas as crucial for Florida panther continued survival and recovery, and recovery goals state that these lands be maintained in order to "contribute to a viable population."[5]

In Kautz et al., the area defined as the Primary Zone is the minimum "space to support a population that is barely viable demographically as long as the habitat base remains stable."[6] The study advocates for a "no net loss of landscape function or carrying capacity."[7] Kautz et al. establishes that the carrying capacity and function of the Primary Zone is linked to not just loss and fragmentation of habitat, but also by areal reduction and configuration[8]. The Recovery Plan echoes this in setting a recovery goal to maintain the full spatial extent of Primary Zone habitat.[9]

As emphasized above, the Primary Zone is considered to be "essential to the long-term viability and persistence of the panther in the wild,"[10] yet the HCP proposes to directly destroy 22,000-24,500 acres of these critical lands (see Exhibit A).[11]

In order to support even a critically-endangered population, Kautz et al states that "*no* habitat loss or catastrophes can be tolerated[12]." Root, et al., 2004, also stipulated that "unless the current condition, amount, and configuration of the currently occupied panther habitat are safeguarded, the long-term viability of the panther is not secure."[13]

The applicants claim that the lands they are proposing to impact are less valuable since they are not necessarily forested or native land covers.[14] However, it was well understood and intentional on the part of the panther scientists to include such agricultural lands in the priority Primary Zone. Specifically, they stated the Primary Zone includes "other natural and non-urban disturbed land cover types between forest patches that serve[] as landscape connections that accommodate

---

[3] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133.
[4] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision.
[5] *Ibid.*, p. 101.
[6] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 129.
[7] *Ibid.*, p. 118.
[8] Kautz, et al , 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 131.
[9] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 104.
[10] *Ibid*, p. 27.
[11] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 68, 72.
[12] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 129. Emphasis added.
[13] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 96.
[14] *Ibid*, at p.14 "The Covered Activities will occur primarily within the previously-cleared agricultural areas that currently possess low proportions of native habitats, and exhibit little native habitat connectivity."

panther home range and dispersal movements[15]." The Primary Zone includes agricultural habitats utilized to meet daily needs and support the prey on which the panther depends. Other available literature has documented an increased use of these types of habitats during nocturnal hours.[16] Therefore, the first tier factor of importance over land cover type is whether land is within the Primary Zone.

Additional best scientific information supports the concept of moving the proposed Covered Activities out of the Primary Zone habitat. The Florida Panther Protection Program Technical Review Team (PRT), a group of six well-known panther biologists[17] who were assembled specifically to review the concepts behind the HCP, also recommended that the applicants direct development away from the Primary Zone:

> *"The PRT acknowledges and supports the Parties' intent as stated in the MOU to avoid, minimize, and mitigate impacts to areas within the Primary Zone as described by Kautz et al. (2006). Therefore, the PRT recommends that future development occurs first in Open Lands that are within the Secondary Zone before lands within the Primary Zone are considered for conversion to urban uses."*[18]

Unfortunately, the draft HCP does not reflect this or other critical input provided by the PRT, which included the former and current FWS Panther Recovery lead staff.[19] All PRT recommendations should be considered under the EIS.

Frakes et al., 2015, also underscores the importance of avoiding prime panther habitat.[20] While the study still considers the Secondary Zone as panther habitat (particularly for juveniles), it was found to have less value for the panther than previously believed.[21] The Frakes et al. study re-emphasizes the critical nature of the Kautz et al. Primary Zone, as the two areas overlap closely.[22] The Covered Activities would impact approximately 14,491 acres of Adult Breeding Habitat as modeled in Frakes et al. (see Exhibit B).[23] Frakes et al. is an addition to a suite of best available science that, again, reinforces the need to move the proposed Covered Activities out of these prime habitat lands that are occupied with the last and only adult breeding population of this critically endangered species.

As indicated by Frakes et al.:

---

[15] Kautz, et al, (2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 122.
[16] Land, et al , 2008. Florida panther habitat selection analysis of concurrent GPS and VHF telemetry data. *Journal of Wildlife Management* 72(3): 633-639. p. 637.
[17] Chris Belden, Randy Kautz, Darrell Land, Tom Logan, David Shindle, Dan Smith.
[18] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 29-31. Emphasis added.
[19] Chris Belden and David Shindle.
[20] Frakes, et al., 2015. Landscape Analysis of Adult Florida Panther Habitat. PLoS ONE 10(7): e0133044. 18 pages.
[21] *Ibid*. P. 15.
[22] Particularly when a 1000m buffer is applied, as utilized by the Florida Fish and Wildlife Conservation Commission.
[23] Covered Activities here, includes the already-permitted Town of Ave Maria.

> *"this [panther] population may already be at or close to carrying capacity, yet the panther population is below what is required for long-term genetic viability. Therefore, protection of the remaining breeding habitat in south Florida is essential to the survival and recovery of the subspecies and should receive the highest priority by regulatory agencies. Further loss of adult panther habitat is likely to reduce the prospects for survival of the existing population, and decrease the probability of natural expansion of the population...."*[24]

The Recovery Plan recognizes that "habitat loss, fragmentation, and degradation, and associated human disturbance are the greatest threats to panther survival and among the greatest threats to its recovery."[25] It is the responsibility of the FWS to ensure that proposed actions are consistent with recovery plan goals: "If recovery plans identify specific habitats as essential for species' survival and recovery, close attention should be given to actions that may affect that habitat."[26]

As the Kautz et al. Primary Zone and the Frakes et al. Adult Breeding Habitat support the only known breeding population unit of the Florida panther, "any loss of reproductive capability... can represent jeopardy because the survival of the entire species is significantly impaired[27]." Therefore, the FWS must require that impacts avoid these habitat areas to the maximum extent, but also must consider such an alternative in the EIS process.

The Primary Zone designated lands within the HCP plan area largely capture all of the lands also indicated as essential for the panther in the newest Frakes et al. habitat model. The Conservancy offers our vision map as another alternative that must be reviewed in the EIS (see Exhibit C). The Conservancy's vision map is closely reflects to the recommendations made by the PRT, Kautz et al., and Frakes et al., in that all urban development and mining were directed to the Secondary Zone.

Reliance simply on the local land use program, the Rural Land Stewardship Area (RLSA) program designations to direct development, does not satisfy the Endangered Species Act (ESA) requirements of minimizing to the maximum extent practicable. This is in part because the program has not incorporated best available science regarding panther habitat (including Kautz et al.) into its map designations of where land use intensification is or is not appropriate.

The Conservancy's vision map demonstrates an alternative that would allow significant development to occur through the RLSA program while maintaining the ecological value of critical lands identified in the Florida Panther Recovery Plan, Kautz et al., and Frakes et al. in the proposed HCP plan area. With the Town of Ave Maria[28] included in the proposed HCP 45,000 acre cap, there are 39,973 acres being sought for future intensification as HCP Covered Activities.

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[24] Frakes, et al., 2015. Landscape Analysis of Adult Florida Panther Habitat. PLoS ONE 10(7): e0133044. P. 15-16. Emphasis added.
[25] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 36.
[26] US Fish and Wildlife Service, 1998. Endangered Species Act Section 7 Consultation Handbook. P. 2-2.
[27] US Fish and Wildlife Service, 1998. Endangered Species Act Section 7 Consultation Handbook. P. 4-37. Guidance provided in the handbook establishes this policy.
[28] Town of Ave Maria was 5,027 acres.

The Conservancy's vision map outlines what "Open" lands are outside the Primary Zone, as well as outside the 1,128 acres of additional non-Primary Zone lands that the Frakes et al. study identified as also important to conserve. This leaves 38,200 acres available for potential additional development, which would in combination of Ave Maria total 43,227 if completely built out.

This demonstrates that if properly avoiding and minimizing as required by law, further development could be sited without directly impacting one additional acre of Primary Zone habitat; therefore, appropriately avoiding impacts to highest value panther habitat. The Collier County RLSA program is available to facilitate credit trading under this scenario and thus refutes the applicant's claims that the PRT alternative is not viable, as the applicants state in the HCP.[29]

Please note that on the Conservancy Vision Map, the Immokalee Sand Mine and the Hogan Island Quarry were also excluded from the Potential Covered Activities area and calculations due to pending permit review and litigation, respectively. These two projects were also excluded by the applicants in their proposed HCP as projects that had initiated federal permitting.

As detailed in the section below, future development under the county's RLSA program was to generate approximately 43,300 acres of intensification in total, so the Conservancy objects to any development beyond that. If future development were allowed on either the Hogan Island Quarry or Immokalee Sand Mine sites, those acreages should be subtracted from the 43,300 acre cap.

The EIS must consider an alternative that moves the Covered Activities completely out of these important areas, such as demonstrated on our vision map.

II. The Role of Existing Local and State Regulations For Consideration in the Draft HCP Review and EIS, as well as Input on the No Action Alternative

The draft HCP is purportedly offering, in exchange for 45,000 acres of intensification within the Covered Activities designation, inclusion of 107,000 acres into Preservation/Plan-Wide Activities, Very Low Density and Base Zoning designations. The stated benefit is that these lands "could otherwise be developed"[30]. This is inaccurate. Approximately 92,185 acres of the 107,000 acres referenced has significant protection and land use limitations already in effect through the Collier County Growth Management Plan's RLSA Overlay and State regulations applicable to the Big Cypress Area of Critical State Concern (ACSC).

While the RLSA is briefly mentioned in the draft HCP (Section 1.7 County-Level Planning and Zoning), a more comprehensive discussion of the relationship between the RLSA policies, ACSC regulations and the draft HCP is necessary to determine the actual vulnerability of the 107,000 acres proposed for "preservation" within the draft HCP. As the draft HCP is the federal companion

[29] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 229.
[30] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. i.

to the local RLSA, such discussion is appropriate during the HCP scoping and review. The following information in this section provides critical information on how the HCP intersects with other existing programs and highlights that the level of benefit outlined to result from the HCP, needed to offset the proposed 45,000 acres of impact, is greatly exaggerated because those protections are already in place without the HCP.

Creation of the RLSA

The RLSA was adopted by the Collier County Board of County Commissioners in 2002 as a voluntary planning Overlay. The implementing policies for the RLSA are contained within the Growth Management Plan's Future Land Use Element. The RLSA covers approximately 195,000 acres and includes the 152,124 acres within the draft HCP. The program was the result of Collier County's requirement to meet the mandate of a State Final Order to:

1. Protect prime agricultural lands;
2. Direct incompatible uses away from wetland and upland habitat, in order to protect water resources and listed species; and
3. Create mechanisms to allow for appropriate conversion of agricultural lands to other uses, while avoiding sprawl.[31]

The resulting planning effort focused on:

- Protection of key flowways;
- Preservation of listed species habitat;
- Prevention of premature conversion of agricultural lands;
- Disincentivizing ranchette development (1 unit per 5 acre homes on well and septic systems); and
- Clustering the existing baseline density into compact, mixed-use developments.

Data, such as land use/land cover, wetlands, listed species habitat, panther telemetry and hydrology were collected and served as the basis for creating a plan to incentivize voluntary elimination of certain uses within key identified flowway, habitat and wetland areas, in exchange for the ability to construct residential and non-residential development in areas identified as less environmentally sensitive. The key flowway areas identified for protection within this planning exercise were the Camp Keais Strand and the Okaloacoochee Slough, and were designated as Flowway Stewardship Areas (FSAs).[32]

Habitat Stewardship Areas (HSAs) were identified as agricultural land that either had value due to the presence of native vegetation or were important because of contiguity to areas with natural characteristics.[33] Note that Kautz et al., the PRT report, and the Frakes et al. study were not assessed or utilized in constructing the HSAs; therefore, not all of the high value habitat areas those panther scientists identified for preservation are not captured in the RLSA HSAs.

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[31] Florida Administrative Commission Final Order 99-002.
[32] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Policy 3.1.
[33] *Ibid.* Policy 3.2.

Wetlands (outside the main flowways) and other permitted water management systems were given a separate classification, reflecting their ability to be used either for agriculture/preservation or to be incorporated into water management systems for future clustered, mixed-use development. These areas were designated as Water Retention Areas (WRAs).[34]

The remaining lands were classified as available for clustered, mixed-use development, and were designated as Open Lands[35]. These areas form the foundation of the RLSA.

See Exhibit D for the Overlay Map. The general breakdown of acreages for FSA, HSAs, WRAs and Open Lands is:

FSAs	31,100 acres
HSAs	40,000 acres
WRAs	18,200 acres
Open Lands	92,800 acres
	*74,500 outside ACSC**
	*18,300 inside ACSC**

**ACSC is the Big Cypress Area of Critical State Concern*

How Does Clustered Development Occur in the RLSA?

Based on a compilation of the above-referenced data layers, each acre of land within the RLSA was given a Natural Resource Index (NRI) Value,[36] with higher numerical values placed on native vegetation and lesser values attached to active agricultural lands (See Exhibit E). Higher numerical values serve to incentivize landowners who own land within FSAs, HSAs and WRAs to participate in the program through voluntarily reducing land uses from their property.

Through an application process, credits are generated by inputting the NRI value into a RLSA worksheet. Next, an applicant determines the land use layers to be removed (Residential,

[34] *Ibid.* Policy 3.3.
[35] *Ibid.* Group 1 Policies.
[36] Immokalee Study Area Stage 1 Report. Created by WilsonMiller. 2000. Appendix J & K and Report and Recommendations of the Collier County Rural Lands Assessment Area Oversight Committee for the Immokalee Area Study. Created by WilsonMiller. 2002.

Conditional Use, Earth Mining and Processing, Recreational, Ag Group 1, Ag Support and Ag Group 2). A landowner is allowed to remove one or more of these land uses, but must remove them sequentially, in the order listed (i.e. you could not remove Earth Mining and Processing until you first removed Residential and Conditional Uses).[37] Finally the NRI values are combined with the land use layers removed and multiplied by the total amount of acreage included within the worksheet to generate credits available to transfer for development in Open Lands.

Once the landowner's application is approved by the County Commission, the land's designation as FSA, HSA or WRA is changed to reflect voluntary participation in the program. The new designation is called a Stewardship Sending Area (SSA), and through approval of the SSA, the agreed-upon land uses for voluntarily removal are no longer allowed on the SSA property.[38]

To use the credits generated within a SSA, a landowner must have property within the Open Lands designation, or attempt to sell their credits to another party who owns Open Lands. Once Open Lands have been identified for intensification, the credits generated from SSAs will allow development, in the form of a town, village, hamlet or compact rural development (CRD).[39]

How Much Intensification Was Expected Within the RLSA?

The intent of this RLSA Overlay, as explained by WilsonMiller (now Stantec), who created the program, was to consolidate the existing density allowed under the baseline zoning of one unit per five acres. According to the *Report and Recommendations of the Collier County Rural Lands Assessment Area Oversight Committee for the Immokalee Area Study*, authored by WilsonMiller in 2002:

> *Using the current zoning entitlement of 1 dwelling per 5-acres on A-Agriculture zoned land as a control total, the maximum number of dwelling units that could be constructed on the 182,331 acres of privately held land would be 36,466 dwelling units. Using an average gross density for compact rural development of 2.17 dwelling units per gross acre, consistent with the Rural Development Characteristics guidelines discussed previously, only 16,805 acres would need to be set aside for the buildout density in compact rural development as opposed to accommodating that same number of units on 182,331 acres of 5-acre home sites.*[40]

At 100% participation, the breakdown of acreage was described by WilsonMiller as:

> *Approximately 85,000 acres of the 182,300 acres of privately held lands are delineated as Flow Way, Habitat and Water Retention Stewardship Areas.*

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[37] Collier County Rural Lands Stewardship Overlay. Stewardship Credit Worksheet. Retrieved from <http://www.colliergov.net/home/showdocument?id=23083>.
[38] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Policy 1.7
[39] *Ibid.* Group 4 Policies.
[40] Report and Recommendations of the Collier County Rural Lands Assessment Area Oversight Committee for the Immokalee Area Study page 40. Created by WilsonMiller. 2002. Emphasis added.

> *Approximately 21,000 acres of ACSC [Big Cypress Area of Critical State Concern] land are able to generate credits as SSAs and retain current agriculture activities, and approximately 60,000 acres of non-ACSC land can also retain its agriculture designation. Approximately 16,800 acres are required for compact rural development.*[41]

Thus, it is clear the RLSA was designed to not only do a better job of protecting natural resources than the baseline ranchette-style development, but to also consolidate the potential build-out density to a footprint of 16,800 acres total, not increase it exponentially to 45,000 acres as proposed in the current HCP.

Collier County's Expectations for the RLSA

The Executive Summary, prepared by Collier County planning staff for the Adoption Hearing of the RLSA Overlay, clearly stated the County understanding of the program's capacity:

> *Although there are 93,000+/- acres of potential SRAs (private lands less FSAs and HSAs), it is estimated that the "8 credit requirement" will set aside approximately 16,800 acres, or 9% of the Study Area, for clustered Development.*[42]

Staff concluded by stating:

> *It is believed that the adoption and implementation of the Rural Lands Stewardship Area Overlay will not result in an increase to the total number of allowable dwelling units or population in the Eastern Lands area, but rather result in a re-allocation of the density and population allowed under the pre-Final Order conditions from a land-consuming checkerboard pattern into compact, mixes-use developments.*[43]

What About Those Landowner Not Participating in the RLSA?

While the RLSA is a voluntary, incentive-based program, in order to fully meet the mandate of the Final Order, the County included a number of policies applicable to non-participating lands. These policies are contained in the RLSA Overlay under Group 3 and Group 5 Policies. The goal of the Group 5 Policies is to:

> *Protect water quality and quantity and the maintaining of the natural water regime and protect listed animal and plant species and their habitats on land that is not voluntarily included in the Rural Lands Stewardship Area program.*[44]

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[41] *Ibid.* Page 41. Emphasis added.
[42] Collier County Board of County Commission Adoption Hearing Executive Summary. October 22, 2002. Page 3.
[43] *Ibid.* Page 5.
[44] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Group 5 Policies.

There are several of these policies that are germane to our discussion of the draft HCP. The first is Policy 5.1, stating its intent:

> *To protect water quality and quantity and maintenance of the natural water regime in areas mapped as FSAs on the Overlay Map prior to the time that they are designated as SSAs under the Stewardship Credit Program. Residential Uses, General Conditional Uses, Earth Mining and Processing Uses, and Recreational Uses (layers 1-4) as listed in the Matrix shall be eliminated in FSAs.*[45]

This prohibition is also contained in Policy 3.5. Therefore, regardless of participation in the voluntary RLSA program, these intensified land uses are eliminated from the approximately 31,100 acres of FSAs within the Camp Keais Strand and Okaloacoochee Slough, leaving only agriculture, agricultural support uses and conservation available on this acreage.

In addition, the voluntary nature of the RLSA was not intended to supersede State Statutes protecting the Big Cypress Area of Critical State Concern. RLSA Policy 5.2 reiterates this by stating:

> *To protect water quality and quantity and maintenance of the natural water regime and to protect listed animal and plant species and their habitat in areas mapped as FSAs, HSAs, and WRAs on the Overlay Map that are within the ACSC, all ACSC regulatory standards shall apply, including those that strictly limit non-agricultural clearing.*[46]

Florida Administrative Code Chapter 28-25.006 details the site alteration regulations for the Big Cypress ACSC, and includes the requirement that for non-agricultural purposes, "Site alteration shall be limited to 10% of the total site size."[47]

For FSAs, HSAs and WRAs not participating in the RLSA and located outside the ACSC, limitations as to non-agricultural use include, "Site clearing and alteration shall be limited to 20% of the property."[48] In addition, Policy 3.6 states "Residential Land Uses listed in the Matrix shall be eliminated in Habitat Stewardship Areas".[49] Moreover, HSAs that have a high NRI value also have Conditional Uses, Earth Mining/Processing and Recreational Uses removed, regardless of whether they voluntarily participate in the RLSA program.[50]

Thus, within the approximately 31,100 acres of FSAs, most intensification is already eliminated through Policies 5.1 and 3.5, and remaining non-agricultural uses are further regulated through the limitations on site alteration found in Policy 5.3 and the ACSC standards. For the approximately 40,000 acres of HSAs, Residential Uses are already removed, and other non-

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[45] *Ibid.* Policy 5.1.
[46] *Ibid.* Policy 5.2.
[47] Florida Administrative Code Chapter 28-25.006(1).
[48] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Policy 5.3.
[49] *Ibid.* Policy 3.6.
[50] *Ibid.* Policy 3.7.

agricultural intensification is removed for a portion of those lands. For the uses remaining within the HSAs and the approximately 18,200 acres of WRAs, there is additional protection in the form of restrictions on site alteration limited to no more than 20% of the property. Combined, these policies already provide significant assurances that little intensification can occur, and where it does occur, it will be extremely limited.

SSA Acreage To Date

Compensation to landowners for the uses that have been eliminated or limited within FSAs, HSAs, and WRAs is through participation in the RLSA, and to date, there have already been significant SSAs put under stewardship easement. While the approximately 5,000-acre Ave Maria development is the only approved town within the RLSA at this time, several landowners have been removing land use layers and placing their FSA, HSA and WRA lands into SSAs. According to Collier County records, approximately 50,500 acres have been voluntarily agreed to remove land uses in exchange for generating credits that can be used to develop in the Open Lands.[51] The remaining uses on these lands are Agriculture Group 1, Agriculture Support and/or Agriculture Group 2 (See Exhibit F). In addition, these SSA agreements also address land management activities to be undertaken.

For example, the Agreement for SSA 5 states that land management will involve "those customarily utilized in ranching operations in Southwest Florida."[52] These management tools:

> *Include prescribed burning, mechanical brush control ("chopping") and other exotic and nuisance species control, fence construction and maintenance, selective thinning of trees, and ditch and ranch road maintenance.*[53]

Therefore, it is a logical assumption that the approximately 50,500 acres currently participating in the RLSA as SSAs not only benefit from the removal of land use intensification, but are also benefitting from a variety of land management activities.

In addition, the RLSA incentivizes restoration within SSAs through the granting of additional credits. The Conservancy is aware of approximately 3,345 acres of SSAs that have been identified for various types of restoration activities.[54]

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[51] Collier County Stewardship Sending Areas Table. Prepared by Marcia Kendall, Comprehensive Planning Dept. 2/27/2014. http://www.colliergov.net/home/showdocument?id=52574. *Note: The acreage as identified in this list is incorrect for SSA #6. The numbers have been transposed. Instead of the Active Acres being 9,119.1, a review of the actual SSA Agreement shows the acreage as 9,911.1. This SSA Agreement can be found at* http://www.colliergov.net/home/showdocument?id=41146

[52] Stewardship Easement Agreement Tract BCI SSA 5. Prepared by George L. Varnadoe, Esq., Young, van Assenderp, Varnadoe & Anderson, P.A., 801 laurel Oak Drive, Suite 300, Naples FL 34108-2771. Page 3 of 7.

[53] *Ibid.*

[54] Rural Lands Stewardship Area Five-Year Review Phase I – Technical Review. Collier County. Table 7-A. P. 13.

The RLSA Only Allowed 16,800 Acres of Intensification: Why Is the HCP Requesting 45,000 Acres?

In the 2007-2008 timeframe, as the County conducted the mandatory 5-year review of the RLSA, County staff attempted to calculate the number of credits contained within the program. After several failed attempts, WilsonMiller (now Stantec) provided the County with their data on how much development the RLSA could allow. The numbers were startling. Instead of the potential for approximately 16,800 acres of intensification, they calculated the capacity for approximately 43,300 acres of intensification, and another 43,700 acres of one unit per five acre development.[55] This combined total of 87,000 acres of impact would be located in those lands designated as Open Lands.

The admission that this amount of intensification was possible within the RLSA was contrary to the original explanation provided to the County and the public about the Overlay. It was inconsistent with County staff's understanding of the program in 2002 during the transmittal and adoption hearings, as reflected in their Executive Summary documents. Despite this, the Conservancy remained willing to work with all stakeholders to explore a compromise that would accommodate the bulk of this exponentially increased amount of intensification within the RLSA boundaries.

The RLSA Does Not Reflect Current Best Available Panther Science

When the RLSA Overlay was created, WilsonMiller (now Stantec) included the most up-to-date data available at that time, in the year 2000. However, it was acknowledged that science was continuing to evolve, especially regarding the understanding of habitat use and needs for the endangered Florida panther. Thus, the WilsonMiller 2000 report stated:

> *The analyses involving panther habitat for the Study will be complemented by ongoing computer modeling of potential habitat and development of an updated panther recovery plan by interagency committees led by the US Fish and Wildlife Service.*[56]

The analyses referenced in this report subsequently later culminated in the Kautz et al., 2006 study, which found that active agricultural fields and open areas were in some cases highly valuable to panthers. This resulted in the designation of Primary and Secondary panther zone habitat, with an emphasis on maintaining the full spatial extent of the Primary Zone.[57]

During the RLSA 5-Year review in the late 2000s, the Conservancy recommended the County overlay the Primary and Secondary panther zones on the RLSA maps and modify these maps to reflect the new panther science by removing all Primary Zone habitat from the Open Lands

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[55] Rural Lands Stewardship Area "Maturity" [Proposed Rural Lands Stewardship Area Overlay]. To: Tom Greenwood; From: WilsonMiller; Date: September 18, 2008; Subject: Estimates of Stewardship Credits under the current and revised RLSA Program and recommendation for Credit calibration.

[56] Collier County Rural and Agricultural Area Assessment. "Immokalee Study Area" Stage 1 Report. 2000. WilsonMiller. P. 14.

[57] Kautz, et al, 2006. How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133.

classification. Because Open Lands are identified as appropriate for intensification per the RLSA, in the form of new towns, mining and other development, allowing such uses on Primary Zone habitat was inconsistent with best available science.

As an alternative, we had suggested that the Open Lands within the Primary Zone would be appropriate for continued agricultural use. Unfortunately, to date, such modification has not occurred, making the Primary Zone habitat within the Open Lands designation the most vulnerable lands within the RLSA.

How Much is Already "Preserved" Without the HCP

Our discussion of the draft HCP as it relates to the RLSA began by asserting that the statement in the HCP that 107,000 acres, which could otherwise be developed, would instead be preserved is not accurate.[58] In the previous sections, we explained the existing local and State policies and regulations that already provide such protection on a majority of these 107,000 acres. Now we will calculate the approximate acreages already protected and how they correspond with the areas proposed for HCP Preservation/Plan-Wide Activities, Very Low Density and Baseline Zoning designations.

- Approximately 80,500 acres of the total 89,300 acres of FSAs, HSAs and WRAs are included in the HCP's Preservation/Plan-Wide Activities designation (See Exhibit G).
- Approximately 50,500 acres of FSAs, HSAs, WRAs, and a small amount of Open Lands, are actively participating in the RLSA through designation as SSAs, which not only removes land uses, but also includes some form of land management.[59]
- Approximately 13,100 acres[60] of FSAs are not yet included in a SSA but still have Residential, Conditional, Earth Mining/Processing and Recreational Uses eliminated[61], and are subject to ACSC[62] and RLSA regulations, including strict site alteration standards for non-agricultural uses[63].

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[58] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. i.

[59] Collier County Stewardship Sending Areas Table. Prepared by Marcia Kendall, Comprehensive Planning Dept. 2/27/2014. http://www.colliergov.net/home/showdocument?id=52574. Note: The acreage as identified in this list is incorrect for SSA #6. The numbers have been transposed. Instead of the Active Acres being 9,119.1, a review of the actual SSA Agreement shows the acreage as 9,911.1. This SSA Agreement can be found at http://www.colliergov.net/home/showdocument?id=41146

[60] Rural Lands Stewardship Area Five-Year Review Phase I – Technical Review. Collier County. Map 1E *(Note: Acreages on this map include SSA 8, which has been rescinded – calculations within the Conservancy's letter have corrected the acreage to remove these rescinded acreages from our calculations.)*

[61] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Policy 5.1

[62] Florida Administrative Code Chapter 28-25.006(1).

[63] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Group 5 Policies.

- Approximately 11,000 acres[64] of HSAs are not yet included in a SSA but still have at least Residential Uses eliminated,[65] and are still subject to ACSC[66] and RLSA[67] regulations, including strict site alteration standards for non-agricultural uses.
- Approximately 15,200 acres[68] of WRAs are not yet included in a SSA but are still subject to ACSC[69] and RLSA[70] regulations, including strict site alteration standards for non-agricultural uses.
- Approximately 8,000 acres of non-SSA, FSA, HSA and WRA are proposed for inclusion in the Preservation/Plan-Wide Activity designation (See Exhibit H). However, these lands are currently restricted to the State ACSC standards, including a maximum 10% site alteration limit.
- Of the 1,961 acres identified as Very Low Density, 1,206 acres are already protected as HSAs and have at least the residential land use removed per the RLSA policies. The remaining 755 acres, while still allowed development at the baseline zoning of one unit per five acres, will be restricted to the State ACSC standards, including site alteration limitations of a maximum 10% (See Exhibit H).
- While we appreciate that the 2,431 acres identified as Base Zoning may eventually be reclassified into either the Preservation/Plan-Wide Activity or the Covered Activities category, it is currently designated at the existing one unit per five acre base zoning and must be reviewed as such. Since this zoning is already in place, and since the ASCS regulations already apply, the HCP does not provide additional meaningful protection for this acreage.

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[64] Rural Lands Stewardship Area Five-Year Review Phase I – Technical Review. Collier County. Map 1E (Note: Acreages on this map include SSA 8, which has been rescinded – calculations within the Conservancy's letter have corrected the acreage to remove these rescinded acreages from our calculations.)
[65] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Policies 3.6 and 3.7.
[66] Florida Administrative Code Chapter 28-25.006(1).
[67] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Group 5 Policies.
[68] Rural Lands Stewardship Area Five-Year Review Phase I – Technical Review. Collier County. Map 1E (*Note: Acreages on this map include SSA 8, which has been rescinded – calculations within the Conservancy's letter have corrected the acreage to remove these rescinded acreages from our calculations.*)
[69] Florida Administrative Code Chapter 28-25.006(1).
[70] Collier County Growth Management Plan. Future Land Use Element. RLSA Overlay. Group 5 Policies.

Category	Acreage
SSAs	Approx. 50,500 acres
FSAs	Approx. 13,100 acres
HSAs	Approx. 11,000 acres
WRAs	Approx. 15,200 acres
Non-SSAs, FSAs, HSAs or WRAs Protected by ACSC Regulations	Approx. 8,000 acres
Very Low Density acreage outside HSA designation already protected by ACSC Regulations	Approx. 755 acres
Base Zoning acreage already protected by ACSC Regulations	Approx. 2,430 acres
Total Existing Acreage Protected by RLSA and ACSC Regulations	Approx. 100,985 acres
Adjustment for SSAs, FSAs, HSAs and WRAs outside of HCP*	Approx. -8,800 acres
Total Adjusted Existing HCP Acreage Protected by RLSA and ASCS Regulations	Approx. 92,185 acres

**There are approximately 89,300 acres of FSAs, HSAs and WRAs, of which the draft HCP includes approximately 80,500 acres. Thus, we have subtracted out the approximately 8,800 acres of FSAs, HSAs and WRAs outside the boundaries of the draft HCP.*

The draft HCP is offering 107,000 acres for retention as rural/ag/preservation/low density development in exchange for allowing 45,000 acres of intensification within the Covered Activities designation. However, approximately 92,195 acres of these lands are already protected from almost all forms of intensification through the existing RLSA Overlay and State ACSC regulations.

The Most Vulnerable Areas Within the Draft HCP

There is no question that the lands identified within the draft HCP as Preservation/Plan-Wide Activities, Very Low Density Use and Base Zoning contain valuable natural resources and are extremely important to protect. However, protection of almost all of these lands from non-agricultural intensification was already mandated by the Final Order, and exists through the RLSA Overlay. Moreover, their continued protection as part of the RLSA is secure, since intensification in the Open Lands cannot happen without credits generated by FSAs, HSAs and WRAs, memorialized as SSAs. It is not the natural resource value of these areas that should be questioned, but rather, their vulnerability as expressed in the draft HCP. This goes to the heart of

whether the benefits proposed truly offset or provide any net benefit for the 45,000 acres of impacts, tens of thousands of which can occur in the Primary Zone according to this HCP.

There is over 20,000 acres of development allowed within lands identified as Primary Zone panther habitat that are included in the RLSA Open Lands category, which is where intensification, such as new towns, is being focused in this HCP (See Exhibit I). Given the low existing vulnerability of the "Preserve" lands (which will mostly consist of actively farmed and ranched areas) and the high amount of priority Primary Zone habitat that will be certainly lost, this proposal overall would clearly be very detrimental to panther protection and recovery.

HCP No Action Alternative

Chapter 10 of the draft HCP discusses alternatives, including the No Action Alternative, stating:

> *Residential development could occur under baseline conditions of one dwelling unit per five gross acres, similar to the Golden Gate Estates development, located just west of the area. Property owners could also enter the RLSP to engage in residential and commercial development at higher densities, in exchange for setting aside environmentally sensitive lands as "Stewardship Sending Areas" ("SSAs"), or by purchasing stewardship credits from a property owner who has designated his land as an SSA.*[71]

Baseline Conditions of One Unit Per Five Acres

The RLSA was designed to incentivize participation in the Overlay, one unit per five acre development can occur in the Open Lands designation. While the draft HCP anticipates intensification within 45,000 acres of Covered Activities, this does not preclude one per five as part of those Covered Activities, nor does it address the 17,800 acres of RLSA land, a majority of which is in the Open Lands category, under the control of non-HCP owners, along with the Hogan Island Quarry (approx. 970 acres) and the Immokalee Sand Mine (approx. 900 acres). The acres outlined above are outside the HCP Covered Activities boundaries and available for one per five development regardless of the HCP. Therefore, the HCP is not a build-out plan demonstrating the total impacts that will not occur, nor will the HCP eliminate one unit per five acre development. If the FWS conducts a No Action Alternative analysis assuming one per five, we ask that the regulatory policies of the RLSA be applied, which would not allow for ranchettes to be located in SSAs, FSAs or HSAs.

Additionally, it should be noted that panthers do utilize the Golden Gate Estates, North Belle Meade, and other rural ranchette communities in the area. So comparing low-density development to still vast amounts of dispersed high-density development, such as is being proposed under the HCP, might indicate that the type of development and location are equally important to just the sheer number of acres when trying to evaluate impacts and benefits. Obviously a home on a five to ten acre lot still provides a lot of green space for panthers and their

[71] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 222.

prey while urbanized areas do not and in either instance, people will be living in closer proximity to panthers.

True Likely Baseline Conditions of RLSA

The most likely development pattern in the RLSA, even if the HCP were not approved, would still be participation in the RLSA Overlay and the development of new towns, villages and hamlets. While there certainly may be some development at one unit per five acres, the idea that without the HCP landowners would forego the opportunity to build new towns is unrealistic. The fact that Golden Gate Estates, which offers ranchettes closer to the beaches and amenities of Naples, is only half built out over the course of several decades show that there is very little market for such development.

Additionally, the infrastructure costs to the developer are much greater than that of a higher-density development; therefore, these proposed cities are much more profitable and appealing. Thus, we ask the FWS to evaluate an Alternative that would represent the true likely "No Action" scenario of assuming that development, in the form of new towns, villages, hamlets and mines, will occur and be permitted through the Section 7 process on project-by-project basis if the HCP is not approved. Not approving the HCP does not preclude the continuation of the RLSA program as Ave Maria and the proposed Town of Big Cypress (AKA Rural Lands West) illustrate. Therefore, the "benefits" of the RLSA can be gleaned regardless of the approval of this HCP. The more likely No Action Alternative, as described above including permitting future RLSA projects via Section 7, needs to be evaluated.

III. Additional Issues and Factors To Be Considered Under the HCP/EIS

Transportation and Infrastructure

Effects to Panther and Other Wildlife due to HCP Covered Activities

The draft HCP states that the applicants do not seek incidental take permit coverage for panther-vehicle collisions, "except to the extent such vehicle strikes occur in the course of a Covered Activity," meaning only those impacts related to construction and maintenance of internal roads.[72] The applicants do not seek coverage for panther roadkills on the internal roadways or beyond the mines and development under the 45,000 acre Covered Activities.[73] This approach ignores the full impact of the proposed activity and segments ESA consultation.

- Under ESA Section 10, the applicants need to provide an assessment of the full impact and take anticipated.[74] Take of Covered Species, notably panthers, caracara, indigo snakes, and wood storks, would likely result from traffic generated by the Covered Activities both on internal roads, as well as roads outside of the development (and outside of the Plan Area as well).

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[72] *Ibid.* P. 24.
[73] *Ibid.*
[74] 16 U.S.C. § 1539(a)(2)(A)(i)–(iv).

- The effect from increased traffic could have far reaching effects, as identified by the FWS in establishing a 25-mile action area to assess indirect effects of projects contributing traffic onto roadways where panther mortalities have occurred.[75]
- Mines within and adjacent to the HCP plan area project daily one way trips of 1,200 to 3,400 per project. Likewise, large residential developments in the region can generate 10,000-30,000 new daily trips once built.[76]
- Increases in traffic volume "may limit the panther's ability to cross highways and may ultimately isolate some areas of panther habitat."[77] Traffic is also linked to increased roadway mortalities.
- According to the PRT, the traffic generated from the Covered Activities would result in nearly half a million daily trips on existing rural roadways in the HCP plan area. New roadways that would be built to accommodate the Covered Activities would receive nearly the same amount of daily trips.[78]
- This is a stark difference between the current level of traffic and what would be generated from approval of the HCP. Many of the rural, two-lane road ways in the HCP area only experience between 300 to 15,000 daily trips.[79] With the traffic from the development authorized by the HCP, seven of the existing roadways would experience more than 40,000 trips per day, four others would have over 20,000 trips per day.[80]
- Corkscrew Road (CR850) and SR82 (west of SR29), both of which route through adjacent Lee county, would be some of the most effected roads from HCP-generated traffic. Corkscrew Road would see the magnitude of daily trips increase by 23.5 times the current rate.[81] SR82 would see projected 61,000 daily trips by 2050 on a roadway where level of service may already be in question.[82]

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[75] FWS sets the 25 mile distance around project footprint based on the mean dispersal distance for subadult male panthers. That action area has been consistently used in biological opinions for the panther, and is means to encompass the wide ranging movements and large home ranges of panthers. E.g., see US Fish and Wildlife Service, 2015. Letter from FWS to Army Corps of Engineers, State Road 80 from Dalton Lane to Indian Hills Drive, Biological Opinion. June 29, 2015.

[76] E.g, According the FWS Biological Opinions, Wildblue generates estimated 10,220 daily trips by 2022, Ave Maria generates between 29,300 trips per day by 2016.

[77] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 39.

[78] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 68-69. Total of Landowner Projected Daily Trips for 2050 would be 453,133 for existing roadways, and 425,473 daily trips for new roadways.

[79] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 54.

[80] *Ibid.*

[81] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 52. Report utilized 2006 as baseline figures.

[82] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 52

The EIS should review the full effect of roadkill and habitat fragmentation on the Covered Species from internal roadways and from traffic generated from the Covered Activities.

Interrelated and Interdependent to HCP Covered Activities

The FWS must identify activities proposed in the plan area that are likely to result in incidental direct, indirect, and cumulative take for all species covered under the plan, including any activities that could result in significant change in behavior, breeding, feeding or sheltering.[83]

There are a number of other uses and projects that would result in additional impacts as a direct result of the requested 45,000 acres of urban development and mining. Additional schools, emergency and fire districts, and other public services, will be prompted by increased development and human population in this currently rural area. These projects, and the habitat lost to accommodate them, should be considered interrelated/interdependent to the Covered Activities sought under the HCP.

The amount of road infrastructure necessary to support the proposed Covered Activities will be tremendous. In 2008, WilsonMiller (now Stantec) submitted a Conceptual Build-Out Roadway Network map to Collier County, demonstrating one scenario of what they believed could be the major road improvements necessary to support 45,000 acres of intensification within the RLSA (See Exhibit J).[84]

- While WilsonMiller did not provide an estimate of what such a road network could cost, the Conservancy, using 2010 construction costs, calculated that the road improvements within the RLSA boundaries could cost over $2.1 billion (Enclosed). This did not include the cost for improvements to roads outside the RLSA, or the cost for upgrades to roads in adjacent Lee and Hendry Counties.

At the local level, planning the necessary future road network and the costs associated with those improvements, is the function of the Collier Metropolitan Planning Organization (MPO). The MPO has a 25-year horizon for their Long-Range Transportation Plan (LRTP), determining what the transportation needs will be and how to prioritize projects, since needs always exceed available funding. The LRTP is updated every five years and the most recent plan, the 2040 LRTP, was adopted December 2015.

- The WilsonMiller (Stantec) conceptual road network, and its potential costs, should be compared to the MPO's 2040 LRTP Needs and Cost Feasible Maps, which depict roads that are necessary and financially feasible through the year 2040[85]. Such a review shows the MPO is not focused on building a massive road network in eastern Collier County, and has instead

[83] US Fish and Wildlife Service, National Marine Fisheries Service, 1996. "Habitat Conservation Planning and Incidental Take Permit Processing Handbook." P. 3-12 – 3-15.
[84] Conceptual Build-Out Roadway Network. Retrieved from http://www.colliergov.net/home/showdocument?id=21624

[85] Collier Metropolitan Planning Organization. Collier 2040 Long Range Transportation Plan Final Report. Prepared for Collier Metropolitan Planning Organization. Prepared by Stantec. Adopted December 2015. Chapter 4, Figure 4-7, pages 4-21 and 4-22; and Chapter 6, Figure 6-1, page 6-4; Figure 6-2, page 6-9; Figure 6-3, page 6-13.

prioritized road improvements closer to the existing coastal urban area. In addition, the projects deemed cost-feasible over the next 25 years clearly demonstrate that funding is simply not available for accommodating the infrastructure necessary to support massive intensification in the RLSA during the MPO's 2040 planning horizon.

- In the Efficient Transportation Decision Making (EDTM) consideration of widening SR29 (south of Oil Well Road), purpose and need were identified as major issues.[86] Approval of the HCP may prompt this project that would not be needed *but for* the Covered Activities.
- 87.5 centerline miles of additional roads, were identified as new roadways needed to support the 45,000 acres of development. All but two segments were projected to be 4 or 6 lane highways.[87]
- Of 24 segments of new roads that would be necessitated by the HCP, 9 of them were recommended by the PRT as "no build" alternative (including a possible new interchange at I-75), and 17 others were recommended to be relocated, due to the impacts to panthers and other wildlife.[88]
- The PRT review of these roadways stressed that these projects could "detrimentally affect wildlife through increased risk of wildlife-vehicle collisions and increased aversion to roads resulting in altered movement patterns, habitat use and behavioral changes" and that avoidance, minimization, and mitigation should be pursued in that priority order.[89]
- The Florida Panther Recovery Plan states that "highways in wildlife habitat are known to result in loss and fragmentation of habitat, traffic related mortality, and avoidance of associated human development. As a result, small populations may become isolated, subjecting them to demographic and stochastic factors that reduce their chances for survival and recovery."[90]
- The Recovery Plan also notes that female panthers' home ranges are severely diminished when bisected by highways[91], and the new Frakes et al, 2015 study shows that road density (as well as human population density) had some of the strongest negative effects on panther presence.[92]
- Roadways will also result in a direct loss of habitat through construction. As recommended by the PRT, these habitat losses should be included in the 45,000 acre cap.[93]
- Highways can also stimulate land development as far away as 2 miles on either side of the road.[94] Thus, not only would the roads themselves account for lost habitat, segmented habitat

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[86] Panther Recovery Implementation Team, Transportation Subteam, 2016. Meeting Summary, January 28, 2016.
[87] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 54.
[88] *Ibid.*, P. 51.
[89] *Ibid.* P. 61.
[90] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 39.
[91] *Ibid.*
[92] Frakes, et al., 2015. Landscape Analysis of Adult Florida Panther Habitat. PLoS ONE 10(7): e0133044. E.g. "… road density was another strong negative predictor of panther presence. In medium quality habitat, a cell with no roads was predicted to be about twice as likely to support adult panthers than a cell with 5km of roads." P. 11.
[93] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 31.

and reduced connectivity, but could also prompt additional development within or outside of the HCP Covered Activities. The Florida Panther Recovery Plan states that for each mile of highway, about 2,500 acres are potentially opened to new development.[95]

- Roadways also produce negative edge effects that can extend "thousands of meters beyond" the road.[96]
- Mortalities due to collisions would increase as a result of these interrelated/interdependent projects. A study of East Collier County Wildlife Movements shows that 33% of vehicular mortalities for the Florida panther are occurring on SR29[97], the main artery for new development in the HCP plan area.
- 2015 was a record year for panther mortalities, with 30 roadkills. Since 1981, 275 panthers have been killed as a result of vehicle collisions. While road density and traffic varied in that time, this represents 35 years of mortalities. About 66, or 25%, of those deaths occurred within the HCP plan area. With additional traffic and new/expanded roadways, and with a term of 50 years, the FWS needs to assess the impact of the HCP on road mortalities.[98]

The Conservancy believes both the environmental and the economic impact of the massive amount of roads infrastructure, as identified on the WilsonMiller (Stantec) 2008 Conceptual Build-Out Roadway Network map, must be considered as the FWS analyzes intensification and related impacts that would result from the proposed Covered Activities in this HCP.

Habitat Loss Cumulative Impacts

The HCP proposes direct loss of 45,000 acres due to urban development and mining. However, there are other additional impacts that must be considered in the EIS review. A cumulative review of impacts should include both past, present, and future activities.

These impacts should be considered in a cumulative impact analysis both under the ESA and EIS, as the law provides.

Within the HCP Plan Area

- Total development (residential, commercial, and mining) envelope has actually identified 49,848 acres of lands that would be authorized for intensification under the HCP, thus indicating that it is reasonably foreseeable the remaining 4,848 acres would also likely be developed outside of the HCP.

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[94] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 39.
[95] *Ibid.*
[96] Smith, 2003. Ecological Effects of Roads: Theory, Analysis, Management, and Planning Considerations: A Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, University of Florida. Citing Forman, 1995.
[97] Smith, et al., 2006. East Collier County Wildlife Movement Study: SR29, CR846, and CR858 Wildlife Crossing Project. Unpublished Report. University of Central Florida, Orlando, FL.
[98] Florida Fish and Wildlife Conservation Commission. Raw mortality data.

- The HCP also depicts Half Circle L Ranch at 2,431 acres as an unknown, given its current status as a for-sale property, as well as Hogan Island Quarry and Immokalee Sand Mine (both projects by applicant Barrow Collier) totaling 1,574 acres being pursued outside of the HCP.
- Non-applicant lands total 17,800 acres. These lands are largely "Open" for development under the RLSA and are more likely to be developed in the future if the HCP is approved.

The areas mentioned above depict a potential of over 26,600 acres of additional lands that may be potentially be intensified in the Plan Area.

Outside of the HCP Plan Area

Hendry County has approved large-scale Sector Plans that would allow tens of thousands of acres of development just north of the HCP. Sector Plans, similar to Rural Land Stewardship Programs, identify lands for preservation or agricultural use as well as lands for development. The Sector Plan is a local planning mechanism that is governed by state statutes.

- Southwest Hendry (King's Ranch) Sector Plan was approved in 2014 by Hendry County. It would allow 23,600 acres of urban development on the other side of the Collier-Hendry line.
- Rodina Sector Plan was approved in 2012 by Hendry County. It provided local authorization of 10,089 acres of development north of the Southwest Hendry Sector Plan.

Likewise, in Lee County, there are large existing and proposed development in panther habitat. Due to the area being identified as a Florida Department of Transportation (FDOT) strategic aggregate area, large-scale limerock mining has already occurred in southwest Florida, particularly the Density Reduction/Groundwater Resource area adjacent to the HCP Plan Area in Lee County.[99]

- Over 13,000 acres of panther habitat has been impacted by Lee County mining[100], which is projected to double with additional mining proposals in the same area[101], which is adjacent to the HCP. The area that could be converted to mining in these two counties could be over 70,000 acres, all in panther habitat.

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[99] Dover, Kohl & Partners, 2008. Prospects for Southeast Lee County: Planning for the Density Reduction/Groundwater Resource Area (DR/GR). July 2008. Prepared for Lee County, FL.

[100] Dover, Kohl & Partners, 2008. Prospects for Southeast Lee County: Planning for the Density Reduction/Groundwater Resource Area (DR/GR). July 2008. Prepared for Lee County, FL; Conservancy of Southwest Florida, 2012. Mining in Southwest Florida presentation to USFWS, January 25, 2012.

[101] I.e., FFD Land Co., Inc. - FFD MEPD Mine App #293270-001EI, issued 8/23/11; Old Corkscrew Plantation LLC - Old Corkscrew Mine App #284086-001EI, issued 6/17/11; Troyer Brothers Florida Troyer Mine App # 292013-001EI, issued 4/5/11; Stewart Mining Industries - Immokalee Sand Mine App #228414-001EI, issued 11/10/04.

Mitigation

This section discusses issues related to mitigation as proposed in the April 2015 draft of the HCP.

Avoidance and Minimization over Mitigation

Impacts to all federally-protected species should be first avoided, then minimized, and finally, *if unavoidable*, be mitigated appropriately. Avoidance is the cardinal principle: "preservation does not warrant an ill-conceived project...in unsuitable locations."[102]

The HCP applicants aim to offer additional mitigation than required by the FWS for panther impacts that are avoidable.[103] Since the scale of development being proposed as Covered Activities in this HCP can be entirely accommodated outside the Primary Zone, that should be required and then mitigation only accepted for unavoidable impacts. For unavoidable impacts, the Conservancy believes that the base ratio for the FWS panther regulatory framework needs to be updated and may result in additional mitigation from projects in panther habitat regardless, somewhat negating these additional Panther Habitat Units (PHUs) provided in the HCP.

In this skewed HCP proposal, mitigation is being offered for avoidable impacts; increased mitigation is received for increased impacts to the Primary Zone, incentivizing development of Primary habitat instead of focusing development away from the Primary Zone.

The HCP also proposes a funding mechanism as part of their mitigation called the Paul J. Marinelli Fund.[104] The applicants state that this is to fund necessary mitigation measures to offset impacts from the Covered Activities for wildlife corridors, crossings, and land acquisition/management.[105] The monetary fund in no way compensates for the lack of avoidance, and is not even likely to produce added resources beyond what will be necessitated to address all of the impacts stemming from this proposal. This exemplifies the flawed approach being proposed in this HCP and is described below in the PRT report:

> *"A greater acreage of impact in the Primary Zone results in a greater number of PHUs of additional mitigation credit, a greater number of acres of panther habitat protected, and a higher contribution to the Panther Fund.... However, the unsettling and perhaps counterproductive aspect of this conclusion is that greater benefit would accrue as a consequence of greater impacts to the Primary Zone, an area that has been described as essential to the survival of the Florida panther*[106] *....The PRT concludes that preserving existing panther habitat is far more valuable than generating funds or providing more*

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[102] Secretary Pelham of the Florida Department of Community Affairs.
[103] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. ii, 15, 26.
[104] *Ibid.* P. i, ii.
[105] *Ibid.*, P. i, 16.
[106] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 37. Emphasis added.

mitigation for impacts to the Primary Zone[107]*.... Payments into the Panther Fund should not be considered an alternative to habitat preservation.*[108]*"*

Further, the FWS current regulatory framework for panthers does not reflect habitat loss that has occurred since it was developed. Thus, the 'additional' PHUs that the applicant is offering as mitigation through the HCP may actually be already necessary through the current regulatory framework to properly offset habitat function impacts.

The FWS should review the Marinelli Fund and propose a revised formula to this mechanism to restore emphasis on avoidance and disincentivizing impacts to the Primary Zone. Additionally, the EIS should review this mechanism to ensure the dollars generated will be adequate to fund the types of mitigation measures the applicants are promising. It should also review the anticipated timing of those activities in conjunction with the intensification allowed under the Covered Activities, if permitted.

Corridors

The draft HCP outlines the general area of corridors, while also depicting areas of Covered Activities that would squeeze these corridors into a configuration and width that would not be functional for the panther.

- The northern corridor does not incorporate the input of the PRT, who stated that "the creation of a north corridor would be a panther conservation enhancement, but *only if its design is robust enough to ensure use by panthers* as future land use changes occur."[109]
- The restoration of these lands to a land cover type that would improve use of the northern corridor by panthers is completely dependent on Paul J. Marinelli Funds to be directed to that use. Prior plans indicated that restoration may only be planting a one-acre patch of short vegetation every thousand feet while continuing intense agricultural operations, which may not support the necessary improvements needed for these corridors.
- Corridor concepts, as found in the draft HCP, uses arrows to show the proposed corridor concepts[110], but does not provide enough detail to ensure that the corridors will be of functional width.
- As per the Florida Panther Recovery Plan, the best available scientific information supports that corridors with a width of 0.6 miles to 4 miles in length be at least 1,312 feet in width, while Noss, 1992 shows that regional corridors be at least 1 mile wide.[111] The slivers of area depicted as Preserve within the corridors show that the northern corridor is approximately 600

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[107] *Ibid.* P. 75. Emphasis added.
[108] *Ibid.*, P. 71.
[109] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 75. Emphasis added.
[110] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 66.
[111] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 30-31.

feet wide, and the southern corridor 975 feet wide at its narrowest, yet these corridors are intended to allow lengthy movements across the landscape.

- As discussed in the sections above, there are projects currently moving forward that may pinch or completely sever the planned corridors. For example, the Immokalee Sand Mine in Collier County, and future development in the Hendry County sector plan areas.
- The southern corridor, currently a natural and heavily utilized landscape linkage through the Summerland Swamp and Horse Trails area, would be unacceptably impacted by the proposed HCP. In fact, the PRT reviewed a similar design and found that "the landowners' proposed [corridor] does not protect the Horse Trail area, and only a single location is proposed for panthers to cross SR29. The PRT recommends that additional areas consisting of native land cover and agriculture be protected... to allow this area to continue to function as occupied panther habitat into the future."[112]
- Existing natural corridors, such as the Summerland Swamp, Camp Keais Strand, and Okaloacoochee Slough, will be directly and indirectly affected by the proposal. The Covered Activities, without the proper buffers, will degrade these existing and critical corridors. Any loss in corridor function could exacerbate the confinement of panthers in South Florida, leading to an increase in road mortality and intra-specific aggression.

  The 2006 East Collier County Wildlife Movement Study ascertains that, while the County's RLSA program "protects wetlands... [it] omits [to] sufficiently protect [ ] uplands in some areas adjacent to these wetland corridors"[113] and recommends restoration of adjacent upland buffers to retain the functionality of the Camp Keais Strand corridor as it is the "only landscape linkage connecting the Florida Panther NWR to the CREW lands."[114] The study advises a 1000 meter buffer to protect these areas (see Exhibit K).[115] Likewise, the PRT also recommended buffers and areas of preservation within the corridors (see Exhibit L).[116]

- Existing least-cost pathways, identified in Swanson et al 2006[117], should be reviewed as potential locations for corridors based on science, not land ownership.

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[112] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. 65.

[113] Smith et al, 2006. East Collier County Wildlife Movement Study: SR29, CR846, and CR858 Wildlife Crossing Project. Unpublished Report. University of Central Florida, Orlando, FL. P. 64.

[114] *Ibid.*, P. 58.

[115] *Ibid.*, P. 65.

[116] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. Figure 13.

[117] Swanson et al., 2008. Use of Least-Cost Pathways to Identify Key Road Segments for Florida Panther Conservation. Fish and Wildlife Research Institute Technical Report TR-13.

Growth Patterns

The EIS should explore the likelihood that ranchette-style development may be prompted by approval of the HCP.

- Due to the added commercial services and amenities being available once the Covered Activities are built, additional ranchette estates development may occur between larger Towns or on non-ECPO lands within the HCP area.

Loss of Agricultural Lands

Impact on Agricultural Economy

The EIS review should cover the loss of agricultural jobs that will result from nearly half of those lands that support the County's agricultural economy.

- Currently, southwest Florida agricultural lands produce over $1.3 billion dollars of crops (mostly vegetables and citrus) a year.[118]
- Within the proposed HCP boundary, there exists today, according to the draft HCP's FLUCCS mapping, 75,083 acres of land used for agricultural purposes.[119] This includes 19,332 acres utilized for Pastures (Improved/Unimproved) and Fallow crop lands, and 55,751 acres of Row Crops, Citrus and Other Groves, and Other Agriculture.[120]
- Of the 49,858 acres proposed for the Covered Activities designation, 43,515 acres are in an agriculture land use classification, as identified by FLUCCS mapping.[121]
- Of these 43,515 acres, the vast majority, 37,677 acres, are classified as being used for more intensive farm activities, such as row crops, citrus and other groves, and other agricultural activities.[122] The balance, 5,838 acres, is classified as Pastures (Improved/Unimproved) and Fallow crop lands.[123]
- Within the 107,000 acres of Preservation/Plan-Wide Activities, Very Low Density Use and Base Zoning, where agriculture will be retained, there currently exists 31,568 acres of agricultural use. This includes 13,494 acres of Pastures (Improved/Unimproved) and Fallow crop lands, along with 18,074 acres of Row Crops, Citrus and Other Groves and Other Agriculture.[124]

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[118] University of Florida, IFAS, 2015. Economic Importance of Agricultural to Southwest Florida. Brochure by Fritz Roka. Agricultural lands totaled 1.3 million acres, forestry acreage and products were not included. Vegetable farm-gate sales totaled $706 million, citrus $326 million, while sugarcane, ornamental and cattle were the remainder, totaling $1.381 billion. Southwest Florida counties included lands outside of the HCP plan area.
[119] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 19 and 39
[120] *Ibid.*
[121] *Ibid.*
[122] *Ibid.*
[123] *Ibid.*
[124] *Ibid.*

- Almost half of the remaining agricultural uses within the Preservation/Plan-Wide Activities, Very Low Density Use and Base Zoning designations are currently comprised of less intensive agricultural uses. If the intensities of agriculture remain the same as today, Collier County's crop output, such as row crops and citrus, will be vastly diminished. If the agricultural uses on the less intensive agricultural lands is converted to more intensive uses, the habitat value will be diminished, and such an analysis must be included in the FWS review.
- Almost half of the currently existing agricultural lands within the HCP boundary - 43,515 acres - could be eliminated for conversion to intensification over the next 50 years with approval of the Covered Activities designation.

Impact of Loss of Agricultural Lands on Covered Species and other Natural Resources

As vital as agriculture is to Florida's economy, the agricultural lands themselves also provide key habitat and ecological functions to the surrounding areas. They provide an important function to Florida's hydrology by acting as water retention areas in addition to providing nesting and foraging habitat, habitat for base prey populations, and necessary components of the life cycle for various wildlife species.

- Agricultural lands support many of the Covered Species, particularly the crested caracara southeastern American kestrel, burrowing owl, wood stork, gopher tortoise, eastern indigo snake, and the Florida panther.
- Morrison and Humphrey, 2001, conducted a study on the distribution and reproductive activity of caracara breeding pairs. They found that cattle ranches were an important habitat for caracara.[125] Another study, Dwyer, 2010, found that citrus groves were also important for juveniles and non-breeding caracaras.[126]
- There is a documented caracara gathering area in northern Collier County where Covered Activities are proposed (see Exhibit M).

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[125] Morrison, Joan, and Stephen Humphrey. "Conservation Value of Private Lands for Crested." *Conservation Biology*. 15.3 (2001): 675–684. "Eighty-two percent of 73 active nest sites found were on privately owned cattle ranches"; "46 breeding areas with 4 years of known histories of occupancy and reproduction, pairs nesting on lands where the major land use was cattle ranching exhibited higher rates of breeding-area occupancy, attempted breeding during more years, initiated egg laying earlier, exhibited higher nesting success, and attempted a second brood after successfully fledging a first brood more often than pairs nesting on lands managed as natural areas."

[126] Dwyer, J, F. (2010) Ecology of Non-breeding and Breeding Crested Caracaras (*Caracara Cheriway*) in Florida. Retrieved from http://scholar.lib.vt.edu/theses/available/etd-05092010-132909/unrestricted/Dwyer_JF_D_2010.pdf. "Specifically, citrus groves were occupied extensively, and row crops were used particularly during breeding seasons". Non-breeding caracaras seem to prefer citrus groves because it serves as a refuge from high temperatures and breeding caracaras as they defend their territory.

- In South Florida, eastern indigo snakes have been documented to utilize agricultural lands, canals and ditches, as well as artificial man-made refugia.[127] Thus, the HCP area contains a notable amount of indigo snake habitat (see Exhibit N).
- Wood storks use man-made wetlands such as agricultural ditches and wet pastures or fallow fields.[128] Other protected wading bird species, such as egrets, herons, ibises, and roseate spoonbills also make use of the shallow waters that collect on agriculture fields and nearby ditches for feeding.
- Due to rapid conversion of short hydro-period wetlands into development in recent years, water retention on agricultural lands are playing a larger role as foraging habitat for these species. In fact, preliminary findings in a recent study suggest that wood storks are relying on manmade canals and ditches in the absence of these more ephemeral wetlands.[129]
- A study conducted by Main and Vavrina, 2009 demonstrated the usage by wading bird species on such agricultural lands.[130] The results from these surveys documented over 1,619 individuals representing 11 species of wading birds.
- Agricultural lands within the Covered Activities at the proposed Rural Lands West (Gargiulo Farms) site are heavily utilized by many bird species, including those protected by the ESA and Migratory Bird Treaty Act. Over 113 species have been documented on these lands.[131]
- Many state listed species also utilize and depend on agricultural habitats in addition to wading birds, as these areas mimic lost native prairies. The Southern American kestrel depends on agricultural fields for hunting.[132] The Florida burrowing owl and the gopher tortoise rely on open pastures or prairies.[133] In areas with no dominant tree cover such as improved pasture, abandoned pasture, cropland (row and field), abandoned citrus groves, fallow crop land, and disturbed habitat like farmland there is a high potential for gopher tortoises.[134]

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[127] Jackson, S., 2013. Home Range Size and Habitat Use of the Eastern Indigo Snake at a Disturbed Agricultural Site in South Florida: A Thesis Presented to Florida Gulf Coast University.

[128] Wood stork (*Mycteria americana*) Five Year Review: Summary and Evaluation, U.S. Fish and Wildlife Service. Accessed by http://www.fws.gov/northflorida/WoodStorks/2007-Review/2007-Wood-stork-5-yr-Review.pdf

[129] Betsy Evans, 2015. Dietary Shifts of Wood Storks in Response to Human-Induced Landscape Changes. Presented at Corkscrew Watershed Science Forum, January 29, 2016.

[130] Main, Martin, and Vavrina, Charles. "Wading birds and agriculture in Southwest Florida." *University of Florida IFAS Extension*. 2009. Web. 16 Aug 2010. <http://edis.ifas.ufl.edu/pdffiles/UW/UW13900.pdf>. Surveys were taken in and around 12 miles of canals serving agricultural operations on a 1,000 acre potato farm for 18 weeks starting in October until March, coinciding with the nesting season of many wading birds in southwest Florida.

[131] eBird, Hotspot Map. Retrieved from < http://ebird.org/ebird/hotspot/L3869562?m=&yr=all&changeDate=Set>.

[132] Field Guide to Rare Animals of Florida, Florida National Areas Inventory (2001). Retrieved from http://www.fnai.org/FieldGuide/pdf/Falco_sparverius_paulus.pdf.

[133] Florida Fish and Wildlife Conservation Commission, 2013. A Species Action Plan for the Florida Burrowing Owl, Final Draft, November 1, 2013.

[134] Ashton, Ray, and Patricia Ashton. *The Natural History and Management of the Gopher Tortoise*. 1st edition. Malabar, FL: Krieger Publishing Company, 2008. 65-93. Print.

Impact of Plan-Wide Activities in the Preserves

The draft HCP states that certain uses will be continued in the Preservation Lands, including a suite of activities ranging from crop cultivation, ranching, forestry, and recreation to oil and gas exploration and production.

WRA Wetlands

These lands, while important to some of the Covered Species, may have restricted access by terrestrial animals, such as the panther, particularly if they are surrounded by or disturbed by adjacent Covered Activities. These patches of habitat would not warrant full credit as panther habitat if panthers were restricted access or activities within the adjacent development are creating a disturbance that would minimize their value.

Intensified Agricultural Uses

If major areas of citrus/row crops are converted to Covered Activities, the FWS should review the potential for pasture or other more valuable habitat to be intensified. Any shift from pasture to row crop would result in a reduction in the actual PHU value of those lands for the panther.

Existing Uses within the Preserve Area

While most of the area indicated as Preserves are agricultural uses, there are approximately 300 acres of existing mine that falls into that category. It would not be appropriate to utilize these lands as Preserve for the purposes of the HCP.

Oil Drilling and Exploration

Although conventional oil drilling has occurred historically in the HCP plan area, in 2013, an unauthorized fracking operation occurred on lands depicted as Covered Activities.

- Oil drilling, including use of hydraulic fracturing, acidizing, and other chemical treatments, present a risk to water supply and environmentally-sensitive lands. These techniques require large quantities –millions of gallons- of freshwater, and there has been no study to understand how these practices would impact Florida's unique geology and hydrology. Lands and water resources can be contaminated at the surface, if wells are poorly constructed, if abandoned wells are not properly plugged, and if wastewater is not properly disposed.
- These types of activities are likely to increase in the future, as there are large seismic exploration projects currently being pursued. The Burnett Oil Company is currently proposing over 70,000 acres for vibroseis exploration within the Big Cypress National Preserve, and using lands within the HCP as a staging area for large, 61,700 pound trucks.[135] Directly adjacent to the Burnett project, is the Tocala seismic survey, which proposes to use tens of thousands of shot holes that are between 50-200 feet deep, over the 100,000 acre project, to explore for oil

[135] National Park Service, 2016. Revised Environmental Assessment for a Proposed Oil and Gas Plan of Operations: Nobles Grade 3-D Seismic Survey within Big Cypress National Preserve Proposed by Burnett Oil Co., Inc. March 2016.

and gas resources.[136] The Tocala project also includes lands that are shown as Preserve/Plan-Wide Activities in the HCP.

Missing Information and Data

The draft HCP does not provide adequate information needed to assess the proposal's effect and impact on the Covered Species or on a number of other requirements under the ESA.

Failure to Provide Adequate Biological Goals and Conservation Measures for All Species
"Good HCPs must be driven by sound biological goals[137]," and while the applicant provides a set of goals, they fail to provide appropriate avoidance, minimization and mitigation assurances to *achieve* the stated goals. Based on the information provided, the conservation measures are inappropriate or are severely lacking, and will not result in the required "no net loss" to the covered species or meet issuance criteria. Additional species-specific conservation actions are needed. The Services' HCP Handbook stipulates that "acquisition of high-quality existing habitat [is] the best approach" for properly minimizing and mitigating HCP-covered impacts[138]. Not only does the proposed HCP fail to properly avoid impacts to the priority Primary Zone for panthers, but it does not even identify prime existing habitat for other covered species. Where nests or other occupied areas are known, as seen in Figures 5-1 and 5-4[139], they are not avoided.

Failure to Provide Adequate Assessment of Effect and Take
A study of HCPs nationwide found that "two-thirds [of HCPs]... [are] insufficient [in] predicting... species' viability[140]" with the plan in place. For the Eastern Collier HCP, insufficient detail has been provided as to how many acres of species-specific habitat would be impacted (using panther habitat as a surrogate), and estimation of how many individuals would be subject to take by the proposed activities.

Failure to Provide Adequate Monitoring Regimen and Funding for Unforeseen Circumstances
The FWS should require that the applicants provide an adequate and appropriate monitoring regimen as a part of this HCP. The applicants need a well-described monitoring plan with a timeline to allow for evaluation of the HCP's success, if permitted, and quantifiable benchmarks to ensure that the minimization and mitigation are implemented as anticipated.

In the Services' HCP Handbook, the agencies recommend setting specific objectives for monitoring, such as information 1) variables to be measured and how the data will be collected, 2) ensuring that variables are consistent with the objectives of the monitoring program, 3) details of the

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[136] Tocala, 2013. Application to Army Corps of Engineers. Letter dated August 22, 2013 to Florida Department of Environmental Protection.
[137] Hopkins and Vasey, 1997. Can We Make Conservation Planning Work in California? Six Steps for Effective Conservation Planning. Linkages, Periodical of the Institute for Ecological Health, Issue No. 5, Fall 1997.
[138] US Fish and Wildlife Service, National Marine Fisheries Service (1996). "Habitat Conservation Planning and Incidental Take Permit Processing Handbook." P. 3-22.
[139] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 101, 125.
[140] Mann and Plummer, 1997. Qualified Thumbs Up for Habitat Plan Science. Science, Vol. 278, No. 5346. P. 2052-4.

frequency, timing, and duration of sampling for the variables, and 4) how the data will be analyzed and who will conduct the analysis.[141]

The Handbook also suggests that HCPs include a plan for addressing unforeseen circumstances. The Services recognize Congressional foresight in dealing with this issue: "...circumstances and information may change over time and that the original plan might need to be revised. To address this situation the Committee expects that any plan approved for a long-term permit will contain a procedure by which the parties will deal with unforeseen circumstances[142]." Although the No Surprises Rule "fundamentally constrains the ability to improve HCPs and avoid species declines,"[143] the plan can be improved through periodic plan review and amended to some degree when biologically necessary. There should also be an earmarked source of additional funds as well for if the plan fails.

Detailed Wildlife Surveying Needed During HCP Review and at Construction

In order to minimize appropriately and meet issuance criteria, additional species surveying is necessary. While wildlife surveying would also be required in the future, closer to the time of actual construction, it is impossible for the plan to adequately avoid and minimize impacts to the Covered Species without better understanding their use of the lands within the HCP.

Wildlife and Covered Species General Issues

Critical habitat Designation for the Florida Panther and Florida Bonneted Bat

Critical habitat designation can inform the HCP process for a more scientifically robust result. As stated in the Congressional Research Service Report for Congress, "adequate knowledge of the habitat needs of the species in question is crucial to and underlies the process of HCP development and approval and is critical to achieving adequate HCPs."[144]

- The Conservancy, and others, have previously petitioned for critical habitat designation for the panther. Although best available science supports our request for critical habitat designation, this was not discretionarily pursued by FWS. In response to the Conservancy's petition, the FWS noted that its priority was implementing the "full suite of actions needed to conserve and recover the Florida panther" including the Florida Panther Recovery Plan.[145] The HCP is the opportunity to secure many actions needed to conserve and recover the panther, namely maintaining the full spatial extent of the Primary Zone as the Florida Panther Recovery Plan and other best available science explicitly states is needed.

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[141] US Fish and Wildlife Service, National Marine Fisheries Service, 1996. "Habitat Conservation Planning and Incidental Take Permit Processing Handbook." P. 3-26 – 3-27.
[142] HR Rep No. 97-385, 97th Congress, Second Session. 50 CFR §17.22(b)(1)(iii)(B).
[143] Defenders of Wildlife. Habitat Conservation Plans. Retrieved from <http://www.defenders.org/programs_and_policy/habitat_conservation/private_lands/habitat_conservation_plans>
[144] Baldwin, 2005. CRS Report for Congress: Designation of Critical Habitat Under the Endangered Species Act (ESA). Order code RS20263.
[145] US Fish and Wildlife Service, 2009. Letter to Gary A. Davis. June 26, 2009.

- Critical habitat is likely to be proposed for the bonneted bat.[146] Recently, natural bonneted bat roosts have been documented close to the HCP area in the Florida Panther National Wildlife Refuge and other conservation lands (see Exhibit O).[147] Satellite transmitters on bonneted bats have found that individuals can forage up to six miles from the roost.[148] Although the proposed designated habitat has not been announced, it may include public and private features in and around the HCP area.

Compensation/Mitigation Banks for the Florida panther

The concept of applicants banking "trapped PHUs" does not appear to be a component of the proposal. That is one significant positive improvement from the 2010 submittal.[149] The PRT found that use of those 'surplus' PHUs, created from the acreage difference between conserved SSAs under the RLSA program and those lands needed for federal mitigation, would be "detrimental to panther conservation."[150]

There are other implications to mitigation banking efforts from the draft HCP. The applicants have stated that the PRT alternative, which aims to move development and mining away from the Primary Zone and other important lands, is not desired due to land ownership.[151] However, the local land use program exists to allow trading of RLSA credits, allowing the footprint of the Covered Activities to be modified into the PRT configuration that would more adequately avoid and minimize impacts.

For those landowners who do not have enough land in Preserve where PHUs can be drawn for applicant-owned mitigation, established and future compensation banks can provide the necessary mitigation credits. In the current configuration found in the draft HCP, there may be little incentive for new lands to be conserved through compensation/mitigation banks, as applicants are ignoring required avoidance and minimization efforts in an attempt to have both developable and preserve lands in their own ownership. The EIS review should include the effect on compensation/mitigation banks, particularly those generating PHUs.

Human-Wildlife Conflict

With the addition of over 300,000 additional people to the HCP area, human-wildlife conflicts, which can take many forms, will increase.

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[146] Personal communication, Tori Foster and Connie Cassler. US Fish and Wildlife Service meeting with the Conservancy of Southwest Florida, October 8, 2015.
[147] US Fish and Wildlife Service, 2015. Research Collaborations Former After Rare Bat Roost Found on Florida Panther Refuge, October 15, 2015. Retrieved from < http://www.fws.gov/news/ShowNews.cfm?ref=research-collaboration-forms-after-rare-bat-roost-found-on-florida-p&_ID=35274>.
[148] Holly Ober, Presentation to Southwest Florida Association of Environmental Professionals, July 17, 2015.
[149] ECPO, 2010. Eastern Collier Multi-Species Habitat Conservation Plan summary. June 2010; Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report.
[150] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. P. xii, 46.
[151] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 229.

- In 2015, there were over 30 depredations of livestock, pets, and hobby animals, mostly in Collier County. About 20 of those depredations were confirmed to be by panthers.[152] Whereas in 2005-2006, there were 5 depredations confirmed by panthers.[153]
- The Florida Panther Recovery Plan states that both conflicts with livestock and public fear of panthers is a very high threat affecting the panther's continued existence.[154]
- Domestic cats (feral and outdoor) would increase panther exposure to the feline leukemia virus (FeLV). While rare, the Recovery Plan states that "recent outbreak of the disease... shows the potential of this disease to be of population significance."[155]
- The Florida black bear, while not a Covered Species, is another factor to consider. Bears were delisted from the Florida imperiled species list in 2012, and are currently being petitioned for listing under the ESA. Bears have been killed by the state due to being considered a safety hazard or being food conditioned. Conflicts with people have occurred within the Town of Ave Maria, as well as in adjacent Golden Gate Estates.

Directing development away from the most important habitats can help minimize human-wildlife conflicts.

Loss of Prey Species

As a component of habitat loss, prey species –such as deer for the Florida panther- will be impacted by the HCP and should be reviewed by the EIS.

- Agricultural lands can have a high value for supporting panther prey. Within the Rural Lands West development (a portion of the proposed Covered Activities), a deer population index (DPI) of 129.1 acres per deer was calculated. The applicant's study concluded that "this census estimate is proximate to census estimates for Big Cypress National Preserve," and provides for even more deer than Corkscrew Marsh, which has a DPI of 249 acres per deer[156].

Duration of Term for HCP/ITP

Considering that this HCP is proposed to cover take for the next half century, species status may change dramatically during the duration of the plan if it extends the entire proposed duration. Fifty years ago, we could not predict the magnitude of threats to the panther or the current management strategies necessary to recover the species. A term of 50 years based on today's understanding is exceedingly risky.

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[152] Florida Fish and Wildlife Conservation Commission. Panther Pulse, Florida Panther Net. Retrieved from < http://www.floridapanthernet.org/index.php/pulse/#.Vxfm6k3rt9A>.

[153] Florida Fish and Wildlife Conservation Commission, 2006. Annual Report on the Research and Management of Florida Panthers: 2005-2006. Fish and Wildlife Research Institute and Division of Habitat and Species Conservation, Naples, Florida.

[154] US Fish and Wildlife Service, 2008. Florida Panther Recovery Plan, 3rd Revision. P. 197.

[155] *Ibid.*, P. 43.

156 Passarella & Associates, 2009. Town of Big Cypress Biological Assessment, June 2009. Prepared by Passarella & Associates for Collier Enterprises Management, Inc. P. 9.

- The timeframe of the HCP is a concern for all of the species within the plan, but especially unlisted species of which little biologically is known, such as the Florida bonneted bat. If scientific knowledge of its population, scope and importance in the ecosystem is poorly understood or unavailable, the "trade-offs" inherent in an HCP design are "impossible to model" and managers will be unable to understand the impacts of the HCP to that imperiled species.
- For the bonneted bat, while there are several studies underway, "relatively little is known of ecology" for this species and "long-term habitat requirements are poorly understood."[157] Since the FWS cannot effectively determine at this time the conservation measures needed to conserve the bat and protect it from no net loss based on such limited data, the FWS should not issue a take permit for this species for which little is known.
- Although adaptive management is an option, the "No Surprises" policy limits the FWS ability to manage species occurring within the plan area. Therefore, the timeframe of an HCP should be greatly reduced to a period of no more than 25 years.

Impacts to Water Resources

Wetlands

While the central focus of the HCP is wildlife, there are additional considerations to water resources that need to be considered.

- The HCP Covered Activities appear to avoid RLSA FSAs and WRAs, there are several hundred acres of additional wetlands that are not included in those designations that may be impacted (see Exhibit P).
- Surface water management is supposed to be a part of the total cap of Covered Activities.[158] However, some WRAs have been used as part of stormwater management systems or for stormwater attenuation. If WRAs are in natural conditions, how will their water quality and hydroperiod be altered by use as part of the stormwater system?

Water Quality

Most all of the watersheds within the HCP plan area are already considered impaired under state standards, meaning they do not meet water quality criteria (see Exhibit Q).

- The existing water quality impairments indicate that many of the waters in the HCP plan area are polluted for dissolved oxygen and nutrients. Current stormwater regulations are ineffective to capture the amount of nutrients from urban development sources. Development will need to implement additional means to capture and treat stormwater to ensure that the Covered Activities will not contribute to further impairment.

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[157] Florida Fish and Wildlife Conservation Commission, 2013. A Species Action Plan for the Florida Bonneted Bat, Final Draft, November 1, 2013.

[158] Eastern Collier Property Owners, 2015. Eastern Collier Multiple Species Habitat Conservation Plan. First Draft, April 2015. Prepared by Stantec Consulting Services. P. 24.

Water Supply and Hydrology

Likewise, the EIS review will need to consider effects of change from natural lands to impervious cover.

- Due to the loss of pervious cover, floodplain storage is likely to be reduced within the HCP area. Currently, this area of the County provides benefits as water storage and aquifer recharge.[159]
- Without the existing lands to store water, the EIS review should incorporate how the regional hydrology may be affected.
- Given the HCP plan area proximity to Picayune Strand, the EIS review needs to include the impact of the HCP on Everglades Restoration.

Hurricane Evacuation

With the projected addition of over a quarter million people to this area, the EIS review must include the effect of the HCP on hurricane and other emergency evacuation.

Climate Change

As one of the most vulnerable states to face challenges from climate change impacts, it is necessary to tactically plan new areas of development in Florida. The draft HCP does not take proper account of several risk factors due to climate change.

- Predicted climate change impacts on species and habitat in Florida includes sea level rise, increased severe weather (including hurricanes events), and new precipitation patterns. Based on current climate change projections Florida's sea level is predicted to rise between 3-4 feet,[160] impacting the Covered Species.
- Lands within the HCP area are vital to adaptation as coastal species move landward.
- For example, the panther's only breeding population is south of the Caloosahatchee River and three feet of projected sea level rise will engulf 30% of current panther habitat.[161]
- Climate change is predicted to increase the amount and severity of hurricane events as well. Hurricanes bring destruction to habitats including loss of trees. This habitat loss leaves many species like the red-cockaded woodpecker (RCW) and bonneted bat vulnerable. Past hurricanes have destroyed RCW habitat and additional severe hurricane events will create more stress for the species.[162]

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[159] Collier County, 2011. Watershed Management Plan.
[160] Defenders of Wildlife. Climate Change and Florida's Wildlife. Retrieved from <http://www.defenders.org/sites/default/files/publications/climate_change_and_floridas_wildlife.pdf>
[161] *Ibid.*
[162] *Ibid.*

- Altered precipitation patterns result in salt- water intrusion and scarcity of water resources.[163] Threats such as sea level rise, storm surges, and salt-water intrusion threatens Florida's biodiversity due to its proximity to coastal areas.[164]

Climate change projections introduce uncertainty for Florida's future and EIS planning should accommodate for these changes.

Public and Protected Lands

Prescribed Fire

One of the most concerning, yet missing aspects of the HCP is diminished use of prescribed fire on regional public lands. Adjacent development will restrict the use of this land management technique that is necessary to keep Florida's preserved lands in good ecological health.

- Florida Panther National Wildlife Refuge managers expressed concerns that the HCP project Rural Lands West (FKA Town of Big Cypress) would substantially impede prescribed burning which is needed to maintain panther prey and habitat.[165] A hospital is currently being proposed within this development and would restrict the ability to conduct prescribed burns over a large area.
- The HCP plan area is framed by major public lands at each of its four corners: Florida Panther National Wildlife Refuge, Big Cypress National Preserve, Corkscrew Regional Ecosystem Watershed, and Okaloacoochee Slough State Forest. Any altered land management as a result of the HCP will have long-lasting effects on the ecology of the entire plan area and beyond. Impacts of the proposed development on public lands outside the HCP plan area must also be fully evaluated and considered.

Conclusion

An HCP should not be in conflict with recovery plans established for the species and must utilize the best available science. Underscoring this point, Congress directed the Services to "consider the extent to which [a] conservation plan is likely to *enhance* the habitat of the listed species or increase the long-term survivability of the species or its ecosystem."[166] An HCP must not "appreciably reduce the likelihood of the survival and recovery of the species in the wild" or "jeopardize the continued existence"[167] of a species, "contribution to recovery is often an integral

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[163] Climate Change, Wildlife, and Wetlands Case Study: Everglades and South Florida. Retrieved from <http://everglades.fiu.edu/Everpres/FI07011001.pdf>.
[164] Reece, et al., 2013. A Vulnerability Assessment of 300 Species in Florida: Threats from Sea Level Rise, Land Use, and Climate Change. PLOS One. Retrieved from <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0080658#B42>.
[165] US Fish and Wildlife Service, Florida Panther National Wildlife Refuge, 2006. Notes and Correspondence.
[166] US Fish and Wildlife Service, National Marine Fisheries Service (1996). "Habitat Conservation Planning and Incidental Take Permit Processing Handbook." P. 7-4.; H.R. Report No. 97-835, 97th Congress, Second Session. Emphasis added.
[167] *Ibid.*, P. 3-20.

product of an HCP[168]." Contribution to recovery should be the goal of this HCP with its fully supporting all Recovery Plans goal and objectives. For the panther, that means protecting the quality, quantity, and full spatial extent of the Primary Zone.

The welfare of all of the species listed on the HCP, especially the Florida panther, is dependent on a quality HCP. The Conservancy hopes the FWS will utilize our comments and other public comments generated by the EIS process to not only understand the effects to the human environment, but also improve the HCP.

Thank you for considering our comments. Feel free to contact us if you have any questions or would like to discuss further.

Sincerely,

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Director of Growth Management and Planning
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Cc:
Dan Ashe, FWS
Cindy Dohner, FWS
Larry Williams, FWS
Roxanna Hinzman, FWS
Victoria Foster, FWS
Connie Cassler, FWS
Kevin Godsea, FWS

[168] *Ibid.*

Exhibit A

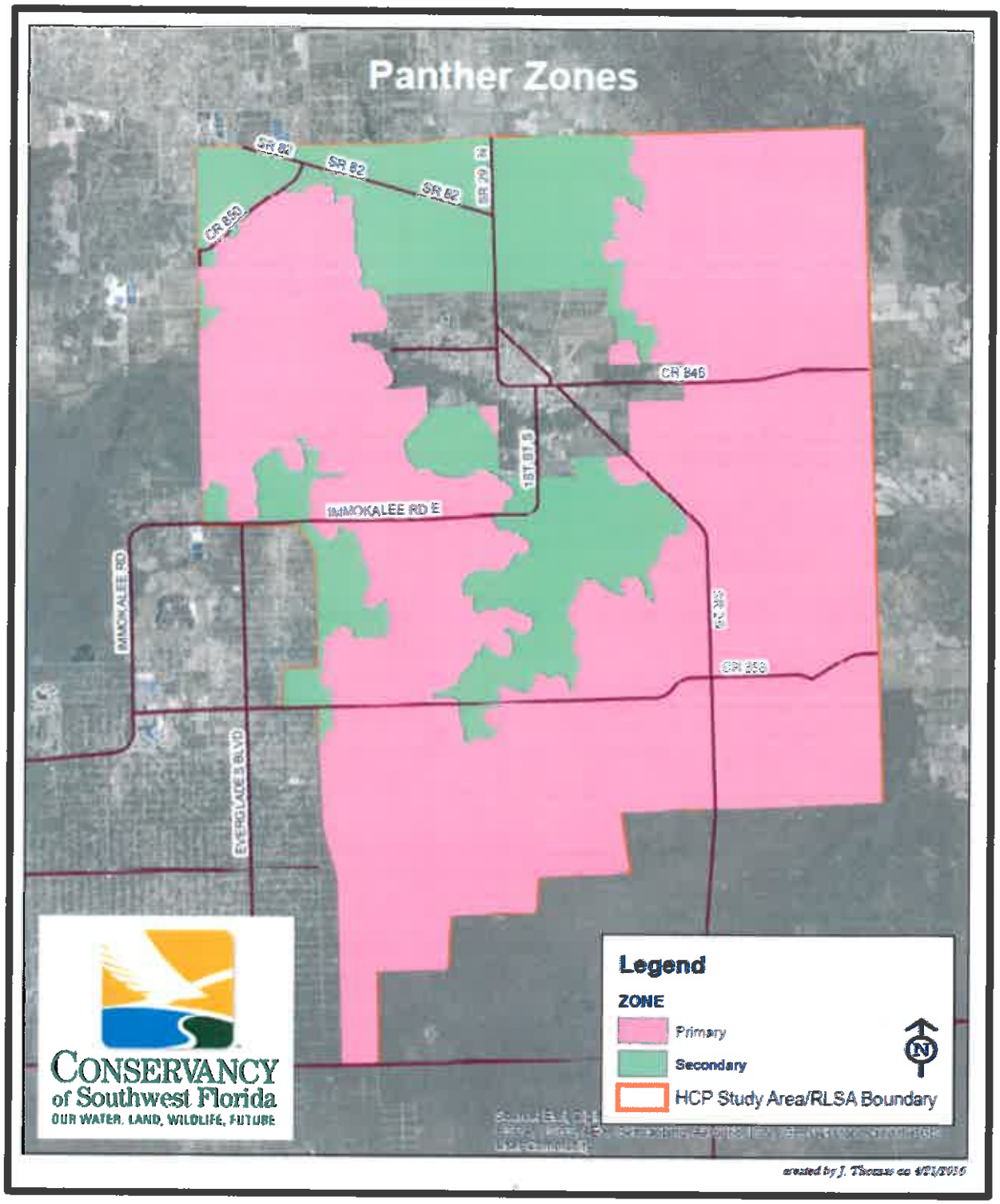

Panther Zones
SR 82
SR 82
SR 82
CR 846
IMMOKALEE RD E
IMMOKALEE RD
EVERGLADES BLVD
CR 858
CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE
Legend
ZONE
Primary
Secondary
HCP Study Area/RLSA Boundary
N

Exhibit B

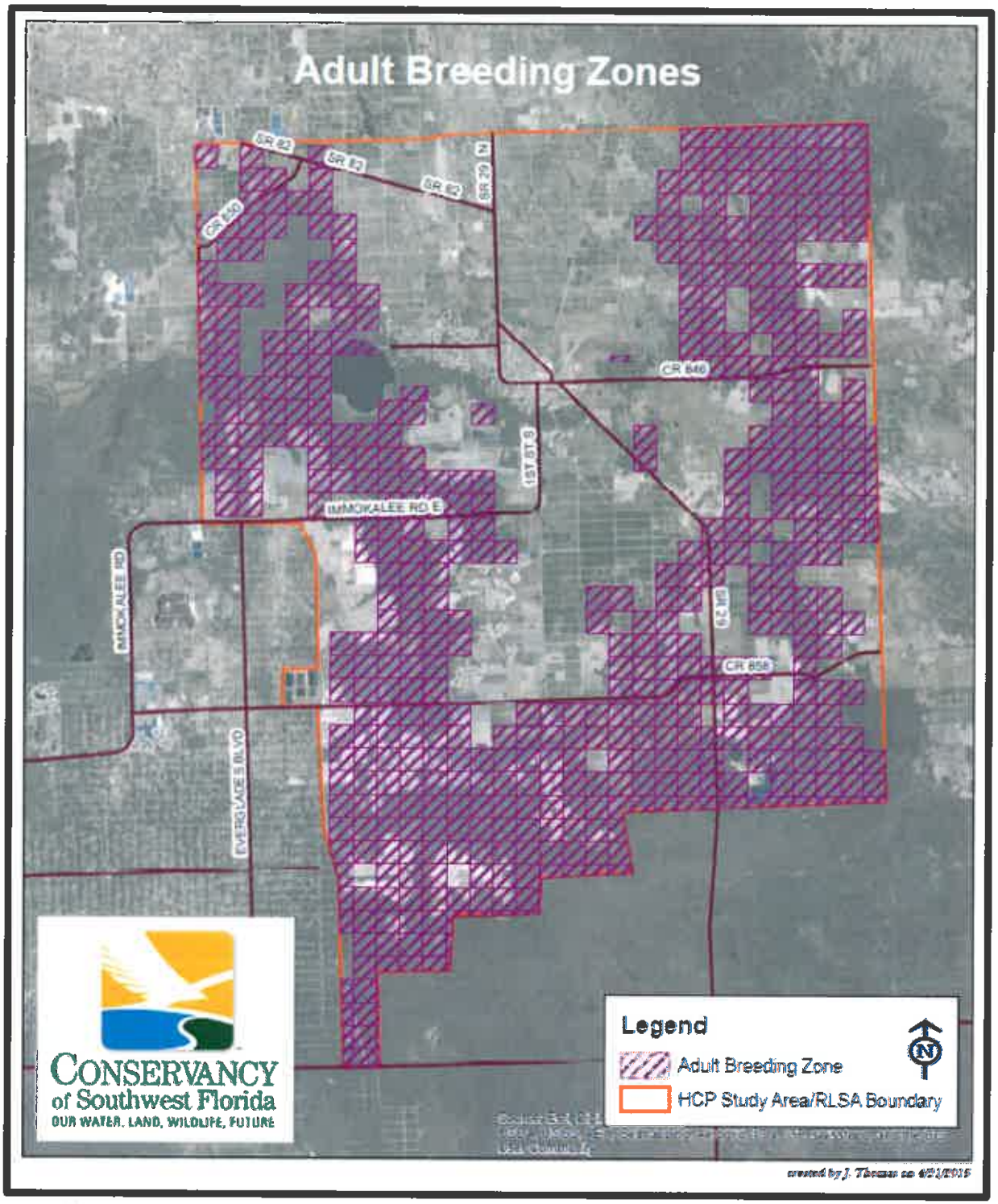
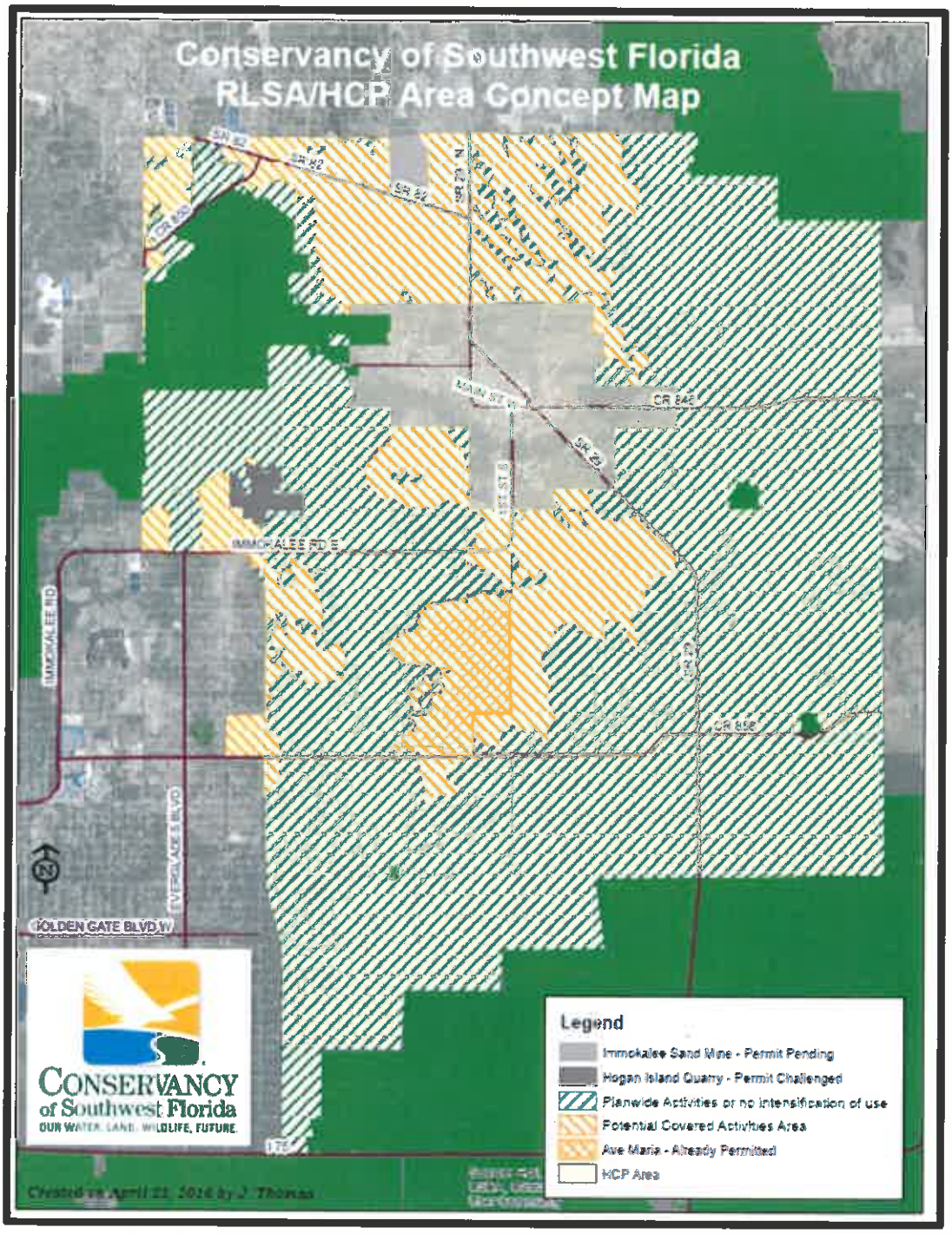

Adult Breeding Zones
SR 82
SR 82
SR 82
SR 29 N
CR 846
CR 846
1ST ST S
IMMOKALEE RD E
IMMOKALEE RD
CR 858
CR 858
EVERGLADES BLVD
CONSERVANCY
of Southwest Florida
OUR WATER. LAND. WILDLIFE. FUTURE
Legend
Adult Breeding Zone
HCP Study Area/RLSA Boundary
N
created by J. Thomas on 4/21/2015

Exhibit C[169]



[169] Prior versions of the Conservancy Vision Map included a northern corridor along a Swanson et al. Least Cost Pathway (LCP) which would be functionally eliminated by the proposed Immokalee Sand Mine. The prior depicted southern corridor, which was also modeled along a LCP, remains –although not depicted on the map- through protection of designated Kautz et al. Primary Zone lands. New information may warrant further refinement of our map.

Exhibit D

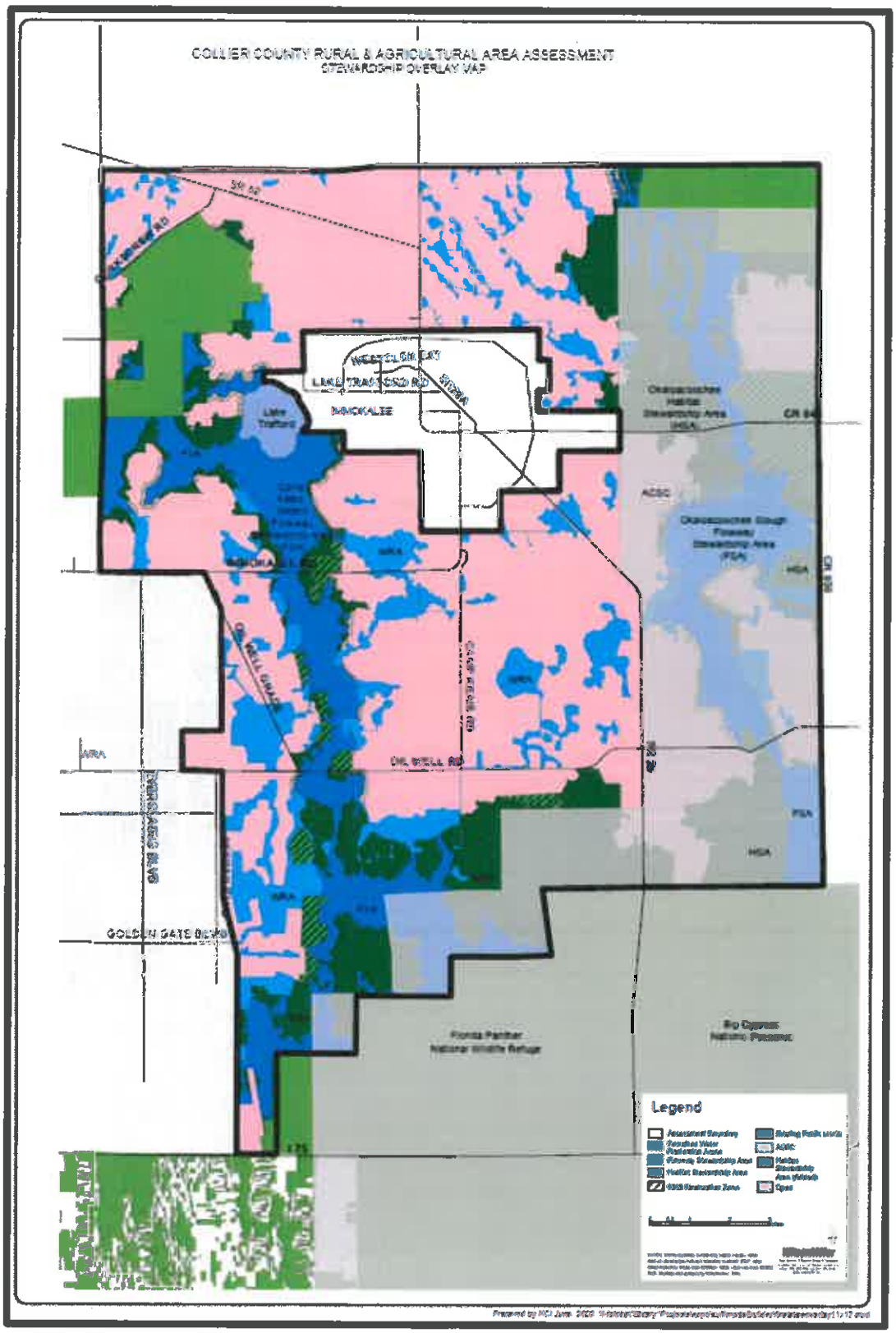

COLLIER COUNTY RURAL & AGRICULTURAL AREA ASSESSMENT
STEWARDSHIP OVERLAY MAP
IMMOKALEE
Lake Trafford
Okaloacoochee Slough Forestry Stewardship Area (FSA)
ACSC
ARA
FSA
HSA
GOLDEN GATE BLVD
Florida Panther National Wildlife Refuge
Big Cypress National Preserve
Legend

Exhibit E

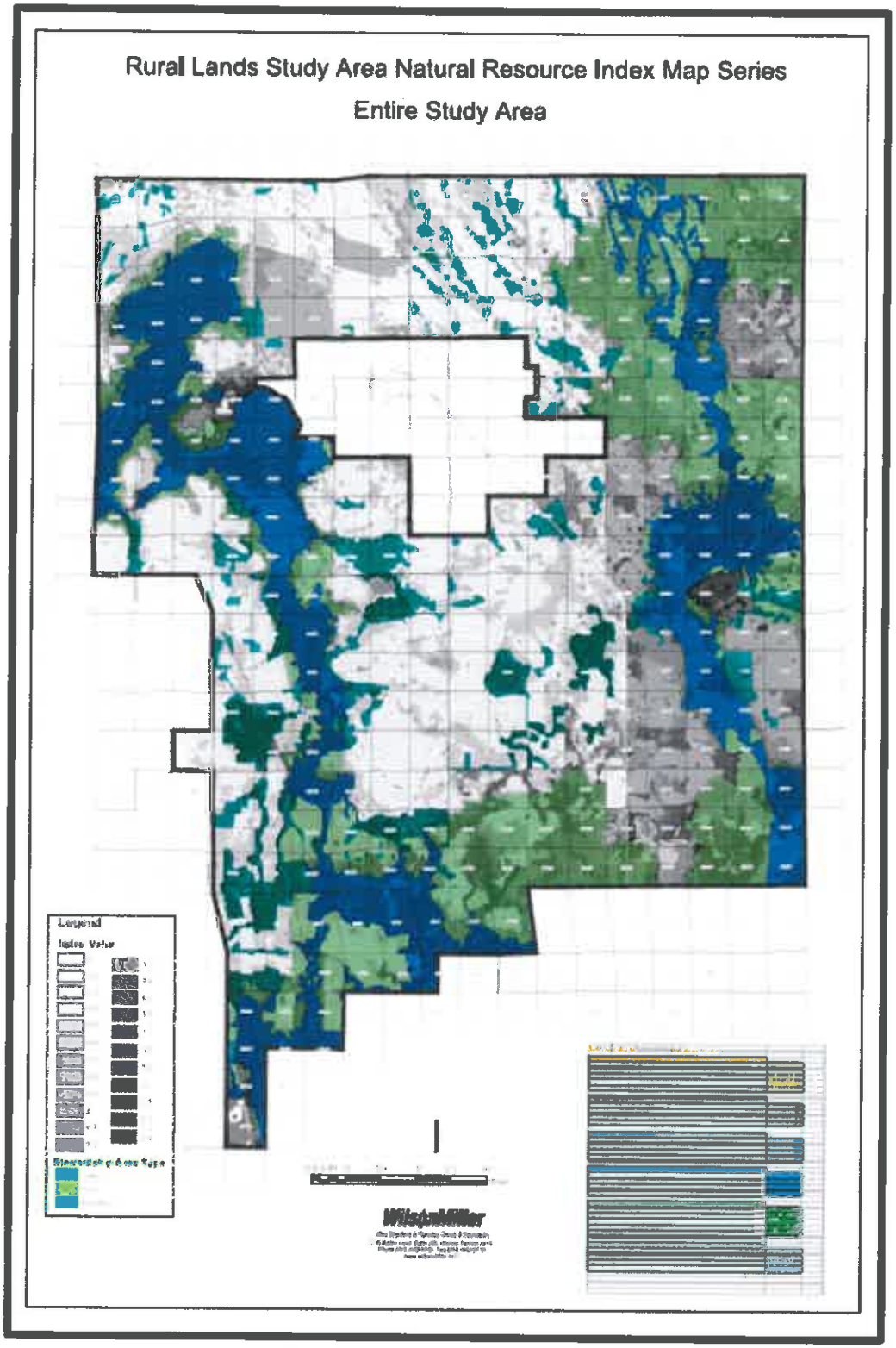

Rural Lands Study Area Natural Resource Index Map Series
Entire Study Area
Legend
Index Value

Exhibit F

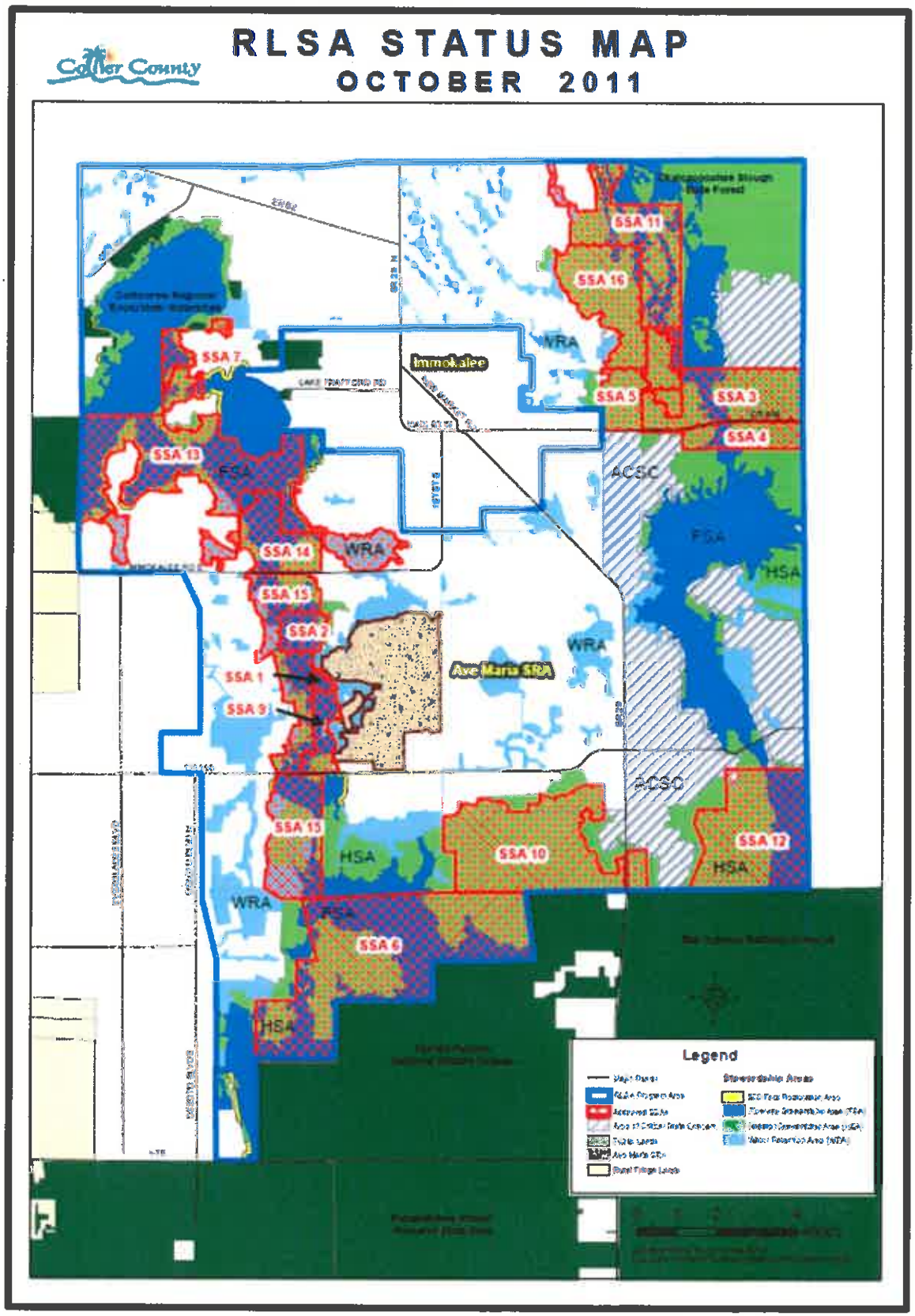

RLSA STATUS MAP
OCTOBER 2011
Collier County
SSA 11
SSA 16
SSA 7
SSA 5
SSA 3
SSA 4
SSA 13
SSA 14
SSA 15
SSA 2
SSA 1
SSA 9
SSA 10
SSA 12
SSA 6
WRA
FSA
HSA
ACSC
Immokalee
Ave Maria SRA
Legend

Exhibit G

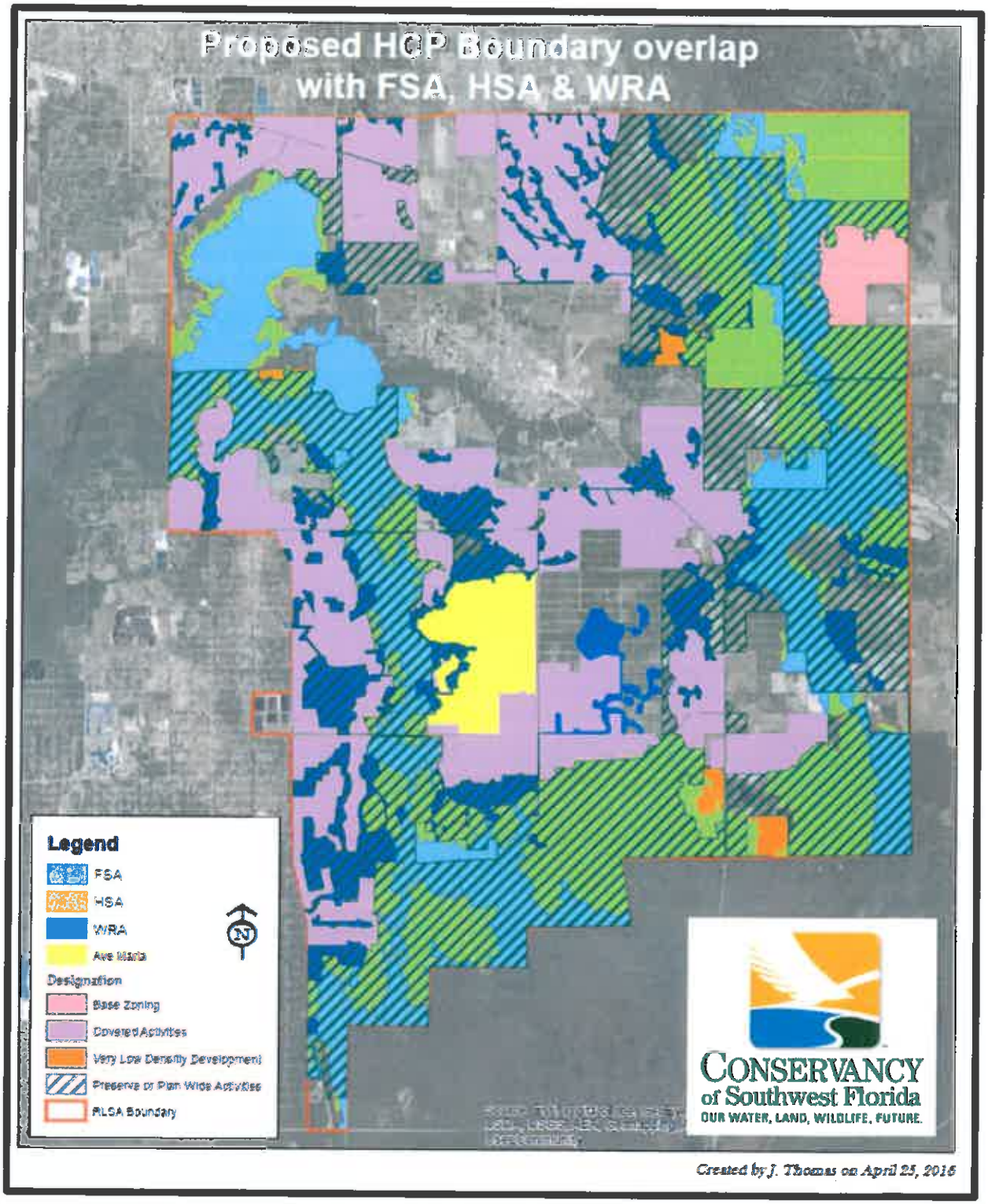

Proposed HCP Boundary overlap
with FSA, HSA & WRA
Legend
FSA
HSA
WRA
Ave Maria
Designation
Base Zoning
Covered Activities
Very Low Density Development
Preserve or Plan Wide Activities
RLSA Boundary
N
CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
Created by J. Thomas on April 25, 2016

Exhibit H

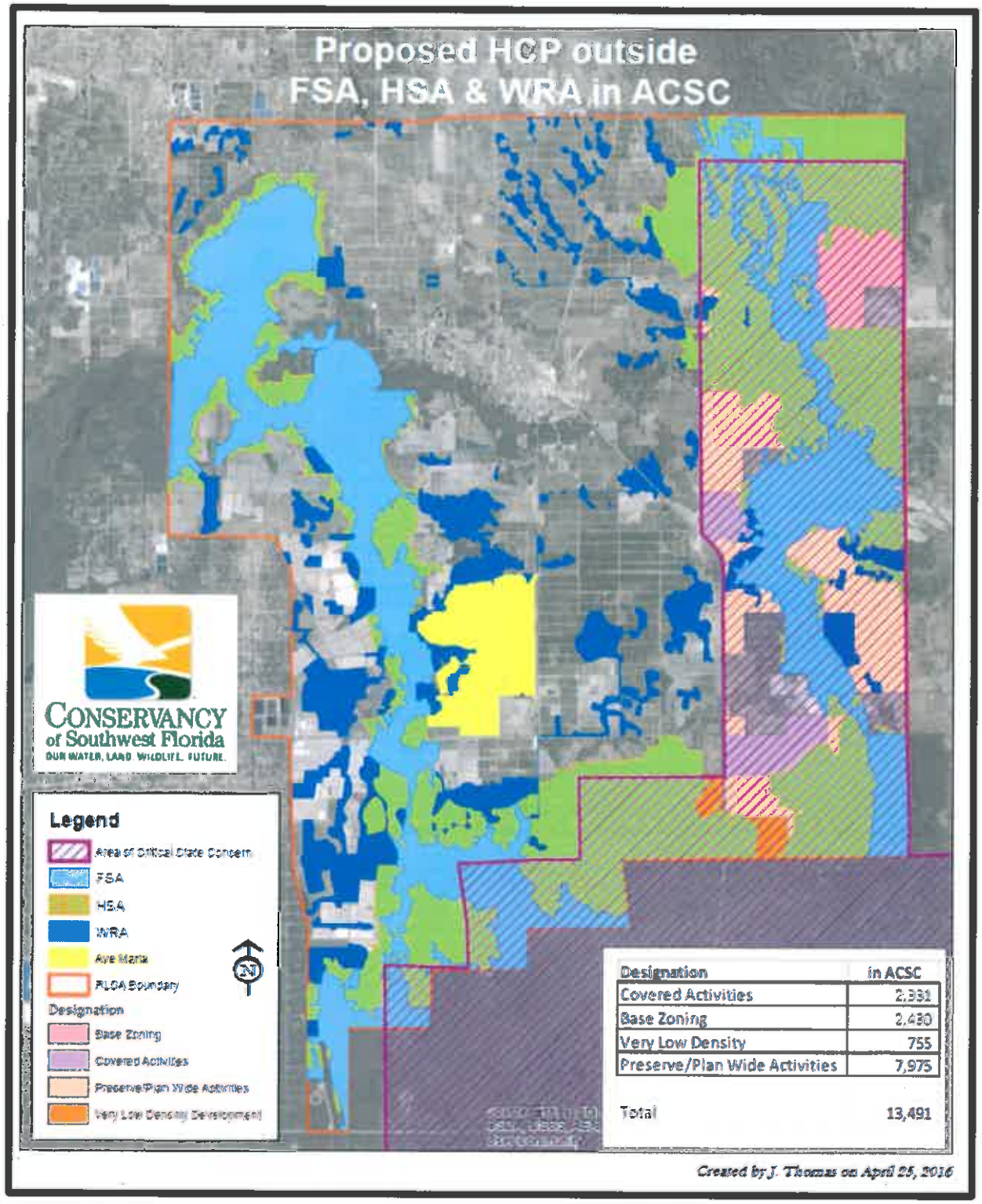

Proposed HCP outside
FSA, HSA & WRA in ACSC
CONSERVANCY
of Southwest Florida
OUR WATER. LAND. WILDLIFE. FUTURE.
Legend
Area of Critical State Concern
FSA
HSA
WRA
Ave Maria
FLOA Boundary
Designation
Base Zoning
Covered Activities
Preserve/Plan Wide Activities
Very Low Density Development
N
Designation
in ACSC
Covered Activities
2,331
Base Zoning
2,430
Very Low Density
755
Preserve/Plan Wide Activities
7,975
Total
13,491
Created by J. Thomas on April 25, 2016

Exhibit I

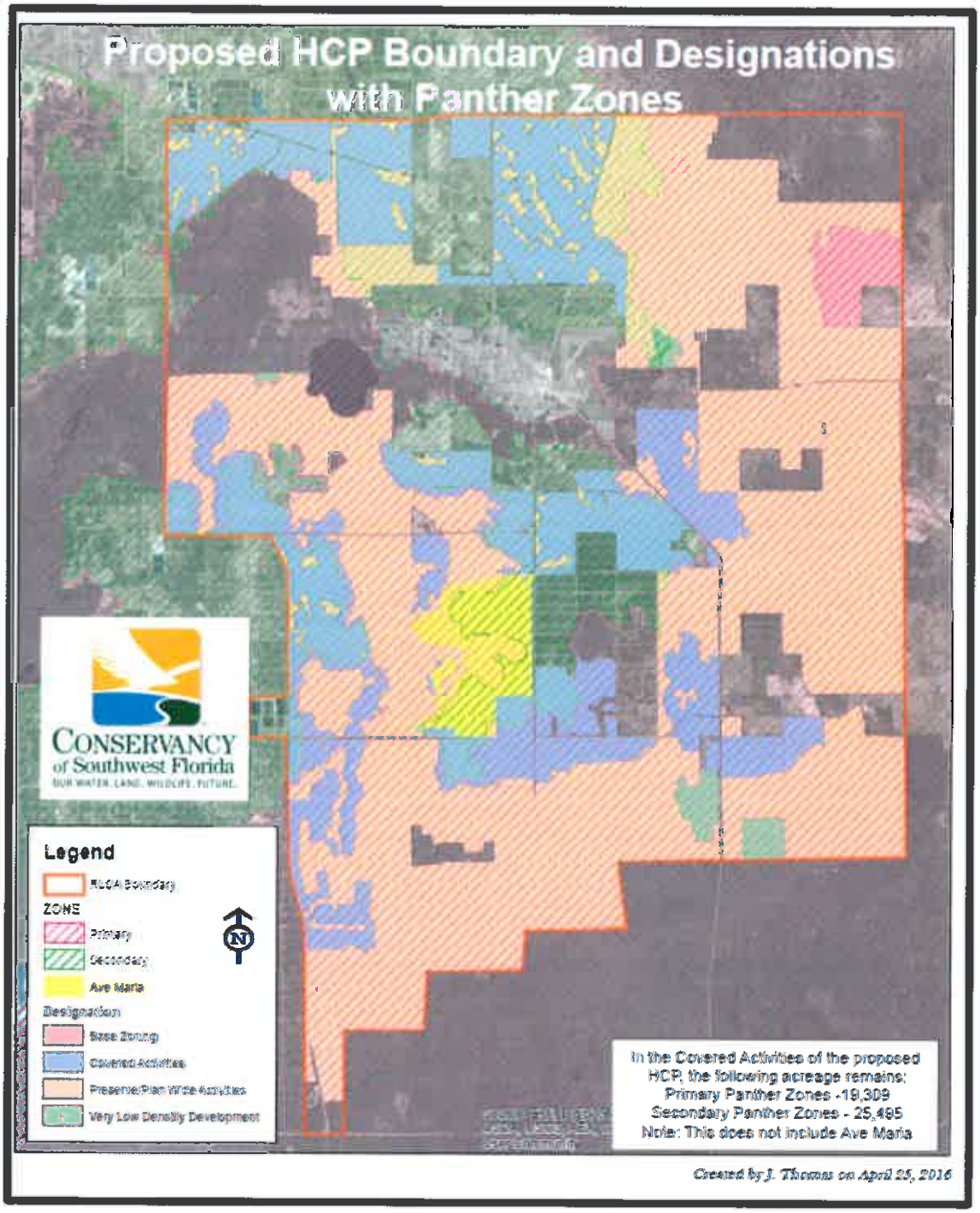
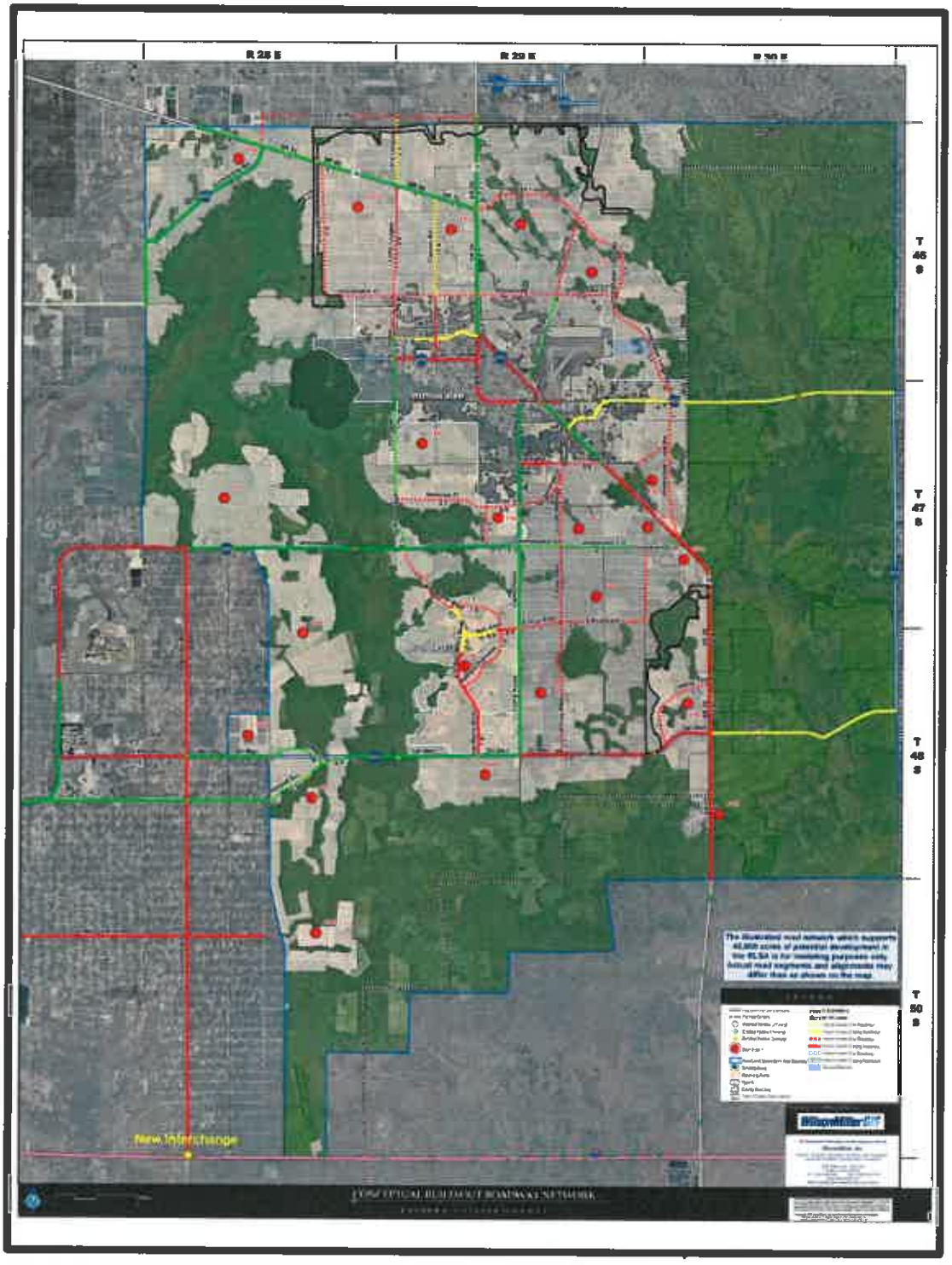
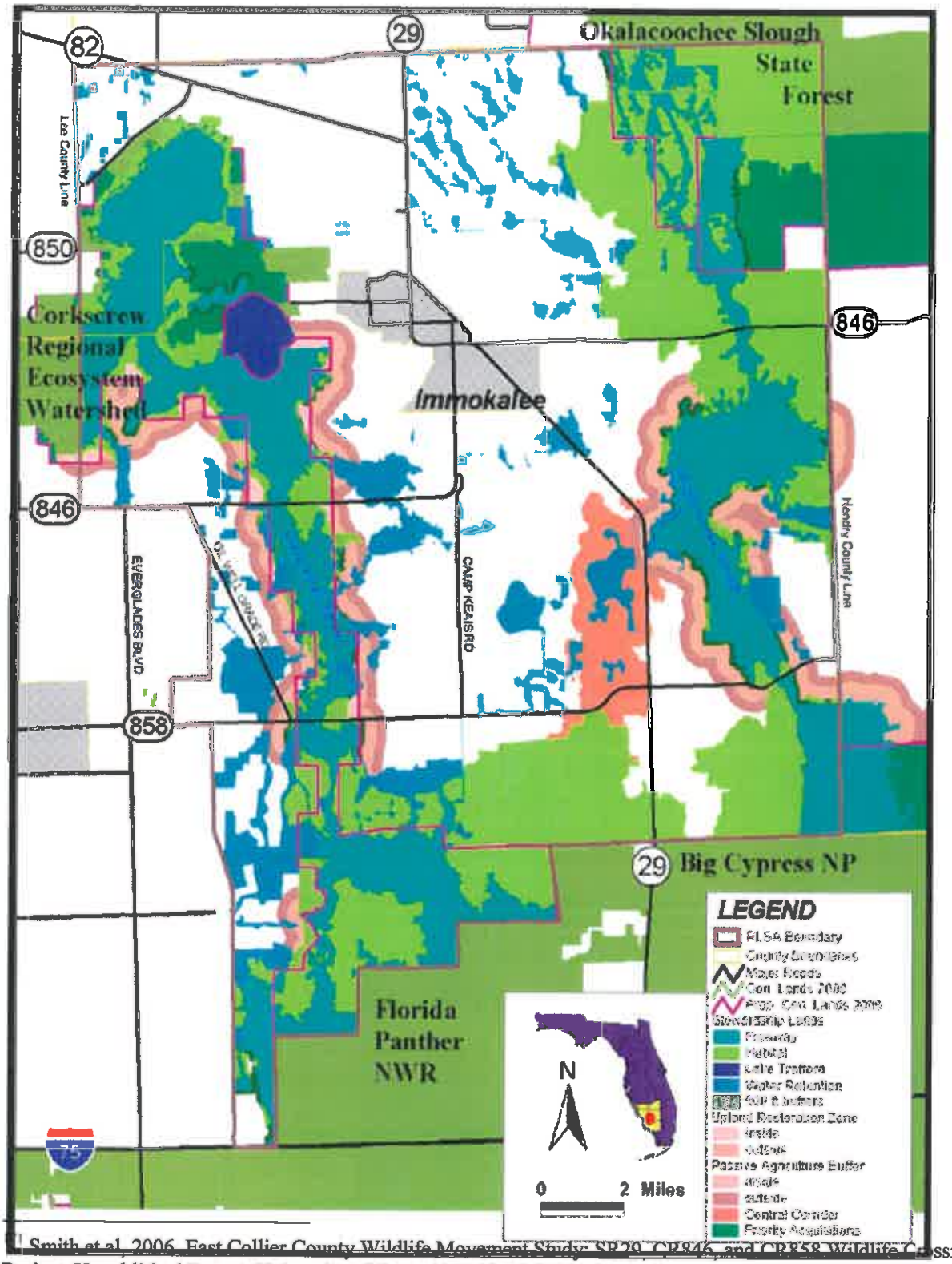

Proposed HCP Boundary and Designations with Panther Zones
CONSERVANCY of Southwest Florida
Legend
ZONE
Primary
Secondary
Ave Maria
Designation
Base Zoning
Covered Activities
Preserve/Non Wide Activities
Very Low Density Development
In the Covered Activities of the proposed HCP, the following acreage remains:
Primary Panther Zones -19,309
Secondary Panther Zones - 25,495
Note: This does not include Ave Maria
Created by J. Thomas on April 25, 2016

Exhibit J[170]



[170] Conceptual Build-Out Roadway Network. Retrieved from http://www.colliergov.net/home/showdocument?id=21624

Exhibit K[171]



[171] Smith et al. 2006. East Collier County Wildlife Movement Study: SR 29, CR 846, and CR 858 Wildlife Crossing Project. Unpublished Report. University of Central Florida, Orlando, FL. P. 65.

Exhibit L[172]

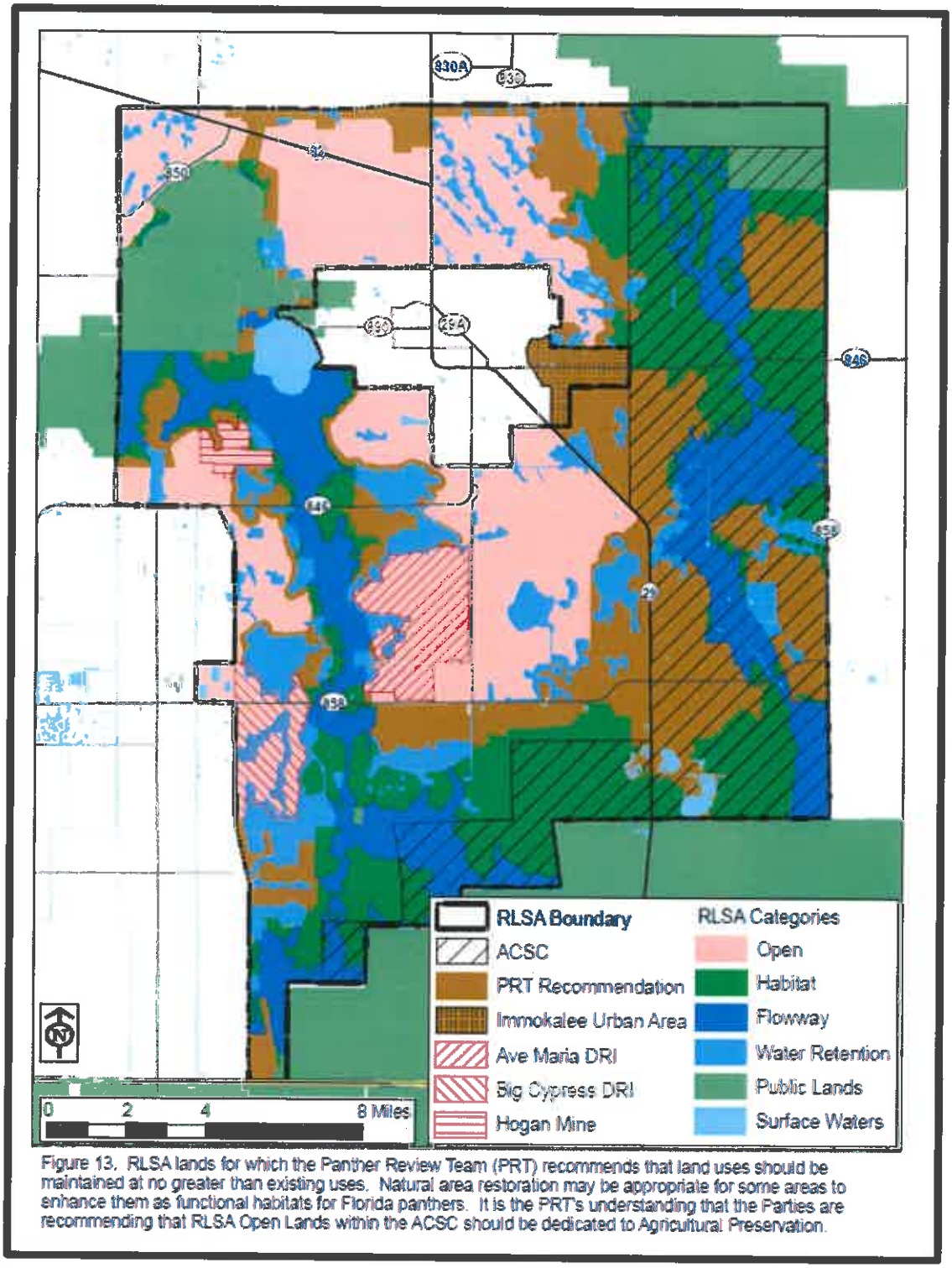


Figure 13. RLSA lands for which the Panther Review Team (PRT) recommends that land uses should be maintained at no greater than existing uses. Natural area restoration may be appropriate for some areas to enhance them as functional habitats for Florida panthers. It is the PRT's understanding that the Parties are recommending that RLSA Open Lands within the ACSC should be dedicated to Agricultural Preservation.

[172] Florida Panther Protection Program Technical Review Team, 2009. Technical Review of the Florida Panther Protection Program Proposed for the Rural Lands Stewardship Area of Collier County, Florida. Final Report. Figure 13.

Exhibit M

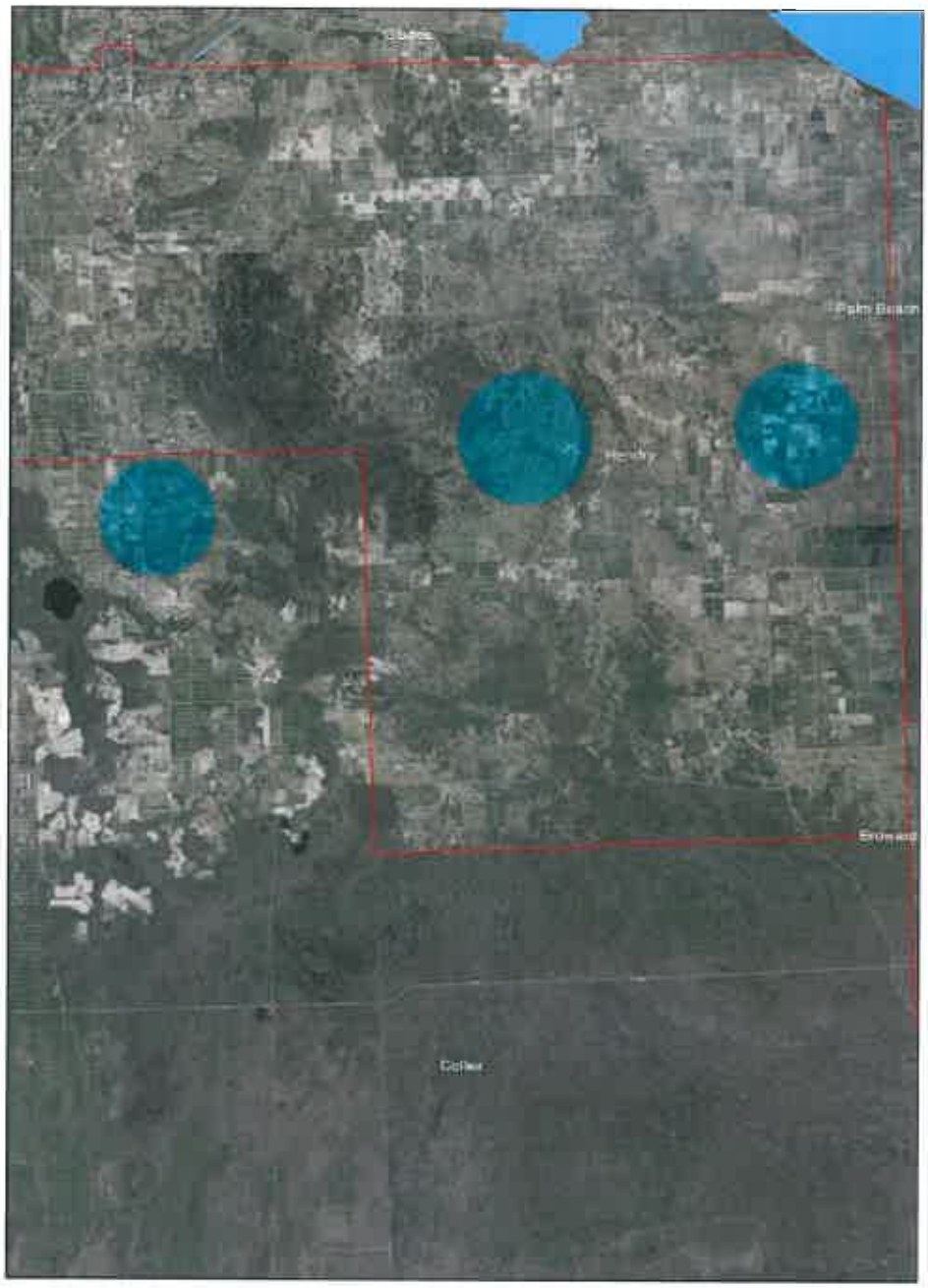
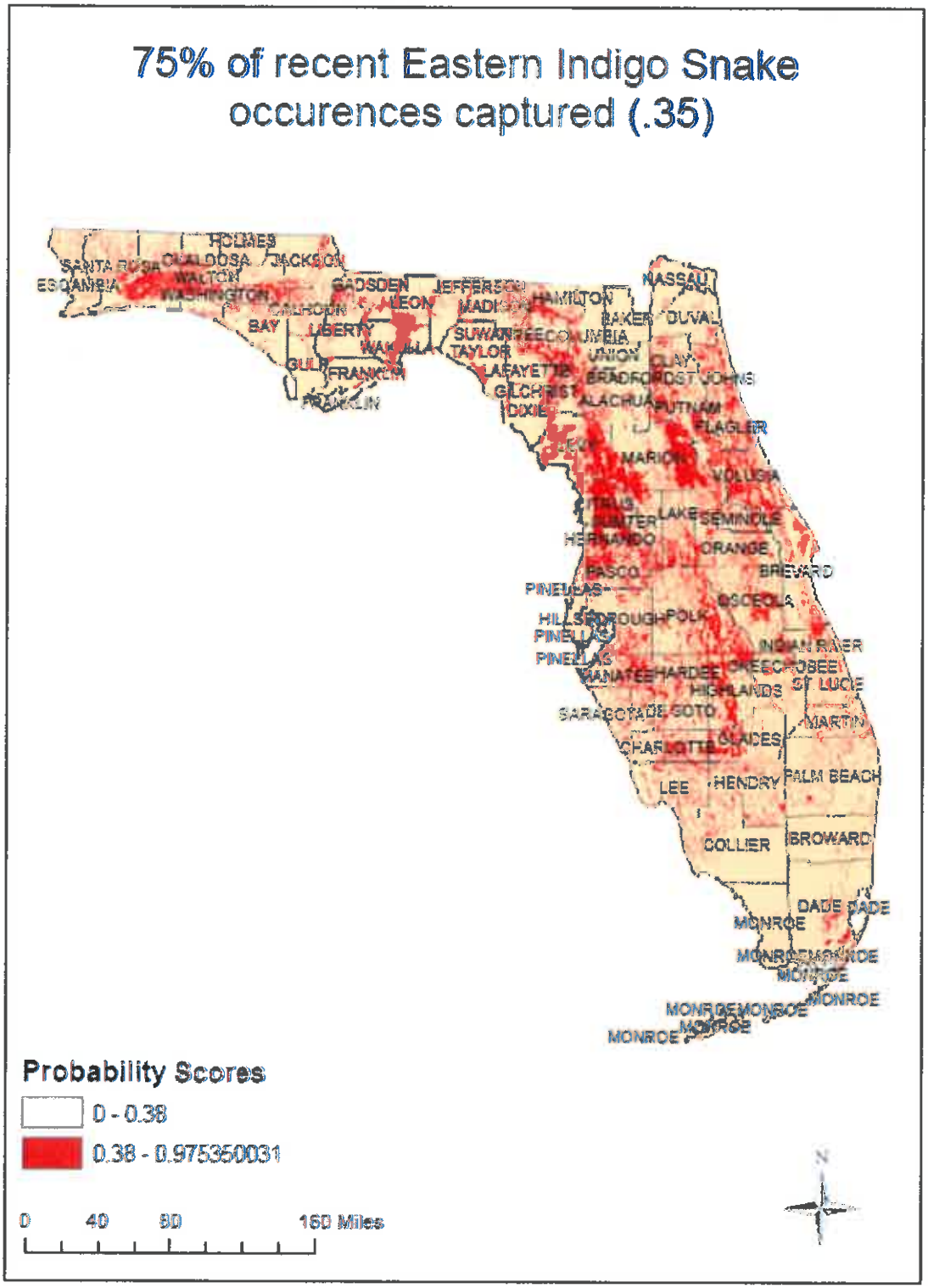
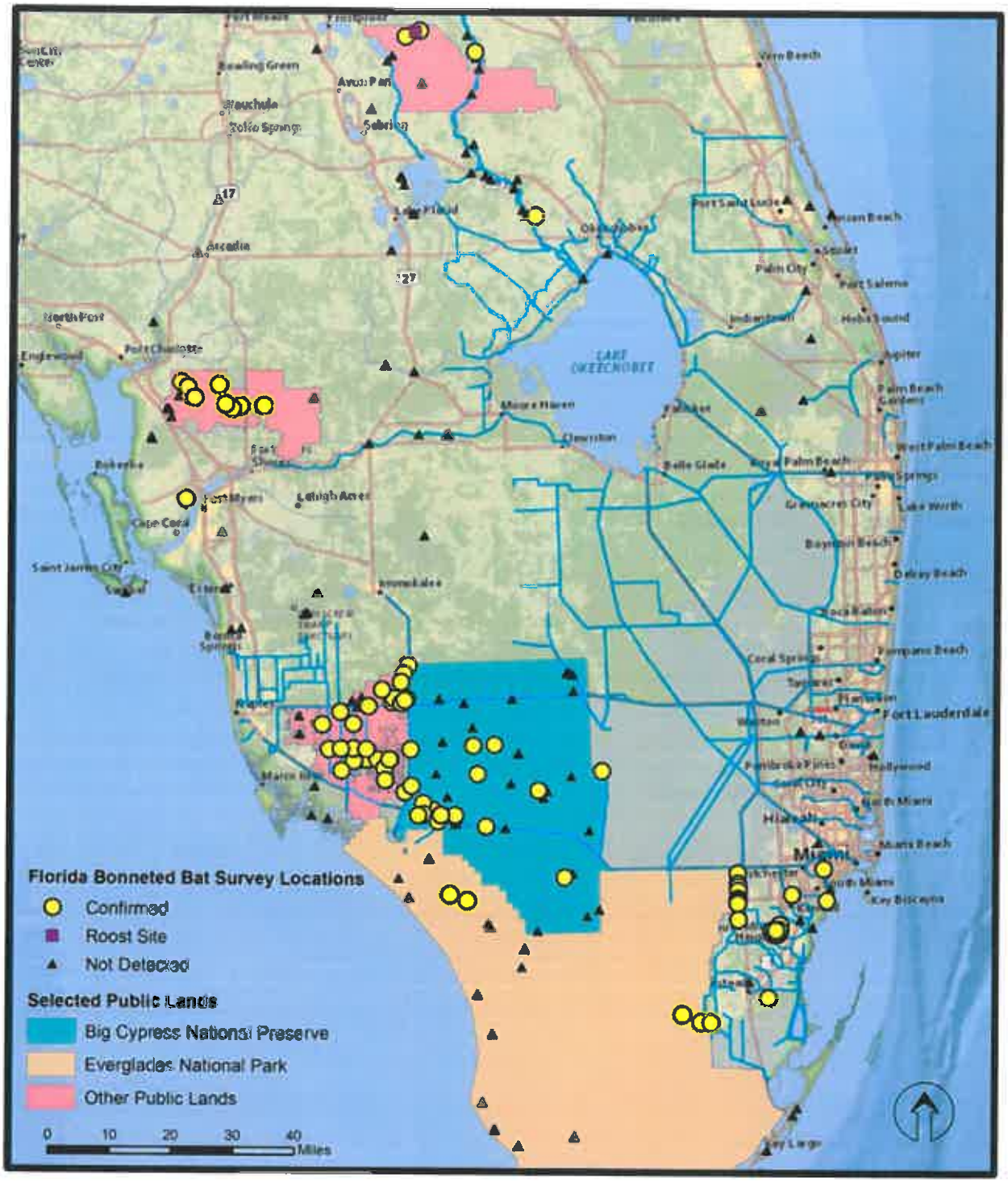


Exhibit N[173]



[173] Florida Fish and Wildlife Conservation Commission, 2015. Eastern Indigo snake Potential Habitat Modeling.

Exhibit O[174]



[174] US Fish and Wildlife Service, 2014. Conserving the Florida Bonneted Bat, South Florida Ecosystem Restoration Trask Force. Joint Working Group/Science Coordination Group, April 2, 2014.

Exhibit P

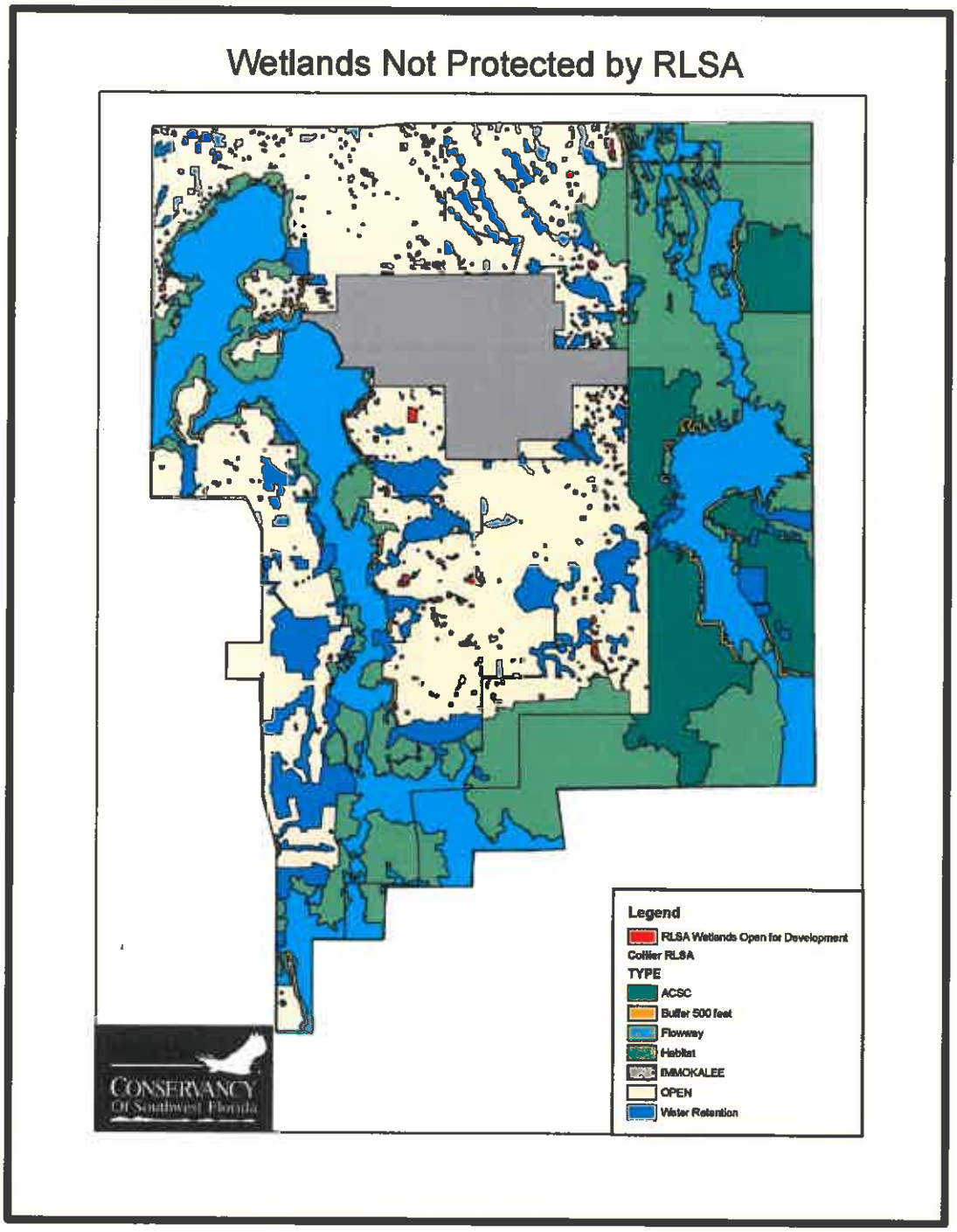
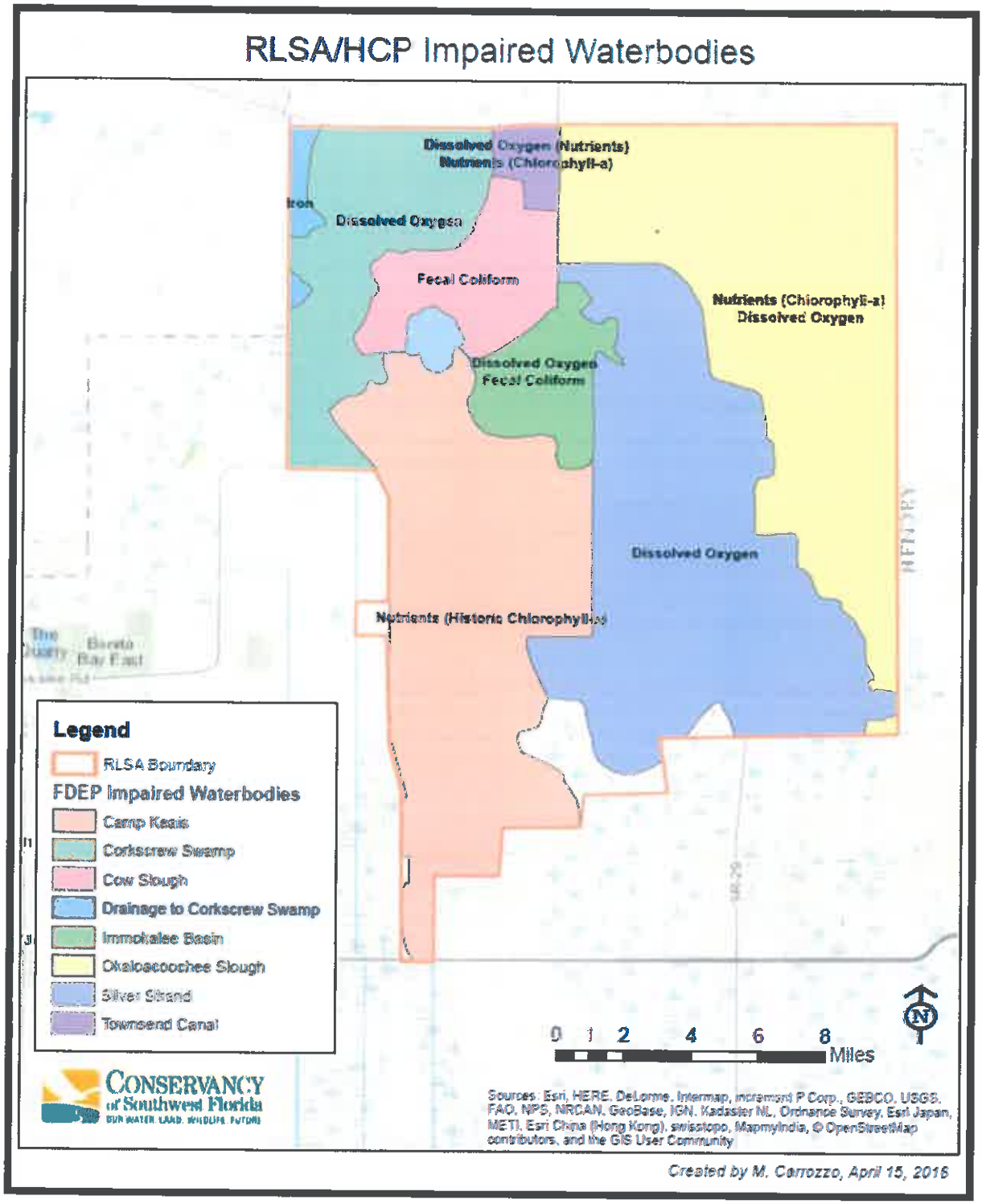

Wetlands Not Protected by RLSA
Legend
RLSA Wetlands Open for Development
Collier RLSA
TYPE
ACSC
Buffer 500 feet
Flowway
Habitat
IMMOKALEE
OPEN
Water Retention
Conservancy
Of Southwest Florida

Exhibit Q


RLSA/HCP Impaired Waterbodies
Dissolved Oxygen (Nutrients)
Nutrients (Chlorophyll-a)
Iron
Dissolved Oxygen
Fecal Coliform
Nutrients (Chlorophyll-a)
Dissolved Oxygen
Dissolved Oxygen
Fecal Coliform
Dissolved Oxygen
Nutrients (Historic Chlorophyll-a)
Legend
RLSA Boundary
FDEP Impaired Waterbodies
Camp Keais
Corkscrew Swamp
Cow Slough
Drainage to Corkscrew Swamp
Immokalee Basin
Okaloacoochee Slough
Silver Strand
Townsend Canal
0 1 2 4 6 8
Miles
N
CONSERVANCY of Southwest Florida
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Created by M. Carrozzo, April 15, 2016

SAVING SOUTHWEST FLORIDA
The Campaign
CONSERVANCY
Of Southwest Florida

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Naples, Florida 34102
239.262.0304
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www.conservancy.org

September 24, 2009

Ms. Holly Bauer-Windhorst and Ms. Jessica White
South Florida Water Management District
Lower West Coast Regional Service Center
2301 McGregor Blvd.
Ft. Myers, FL 33901

Re: Town of Big Cypress, ERP Application #080103-6

Dear Ms. Bauer-Windhorst and Ms. White:

The Conservancy of Southwest Florida, representing over 6,000 members, is writing to express continued concerns with the proposed Town of Big Cypress (TBC) 3,699-acre, mixed use residential, commercial / recreational development proposed for construction within the Big Cypress Stewardship District (BCSD) watershed (ERP Application #080103-6, Figure 1). We would respectfully request these comments be considered in addition to those that we previously submitted on May 13, 2009, as many of those comments remain unaddressed.

The Conservancy of Southwest Florida has retained professional experts to carefully review all the documents on the South Florida Water Management District (SFWMD) ePermitting web site for the subject application for a Conceptual Environmental Resource Permit for TBC. Additionally, they also reviewed the Environmental Resource Permit (ERP) modifications issued on June 12, 2009 to Collier Enterprise Management, Inc. for projects named Shaggy Cypress Agricultural Development (ERP #11-00112-S) and Camp Keais Agricultural Development (ERP #11-00178-S), as well as associated SFWMD staff reports and drainage analyses prepared for those modifications. Reviews have focused primarily on the hydraulic and hydrologic aspects of the application. The findings of their review are summarized as follows:

<u>Inappropriate Discharge Rate</u>

A 25-year, 3-day design storm event is used to compute the off-site discharge rate, consistent with the SFWMD Basis of Review (BOR) for ERP Applications. However, it appears that the basis for the limiting amount of off-site discharge assumed for the design has not been substantiated and that the amount being proposed is inappropriate based on BOR guidelines.

According to the BOR, the off-site discharge rate is to be limited "to rates not causing adverse impacts to existing off-site properties, and: (a) historic discharge rates, (b) rates determined in previous District permit actions, or (c) rates specified in District criteria". Additionally, Collier County Ordinance 90-10 prescribes that the local design discharge be in accordance with Chapters 40E-4 and 40E-40, F.A.C., SFWMD BOR, and amounts

which will not cause adverse off-site impacts. Furthermore, the amounts may be determined by the "most restrictive" of the following:

- Historic pre-development discharges;
- Amounts determined in previous SFWMD permit actions;
- Amounts specified in BOR Appendix 2;
- Amounts based on system capacity for selected county primary outfall canals; and
- In all other areas shall not exceed 0.15 cfs/acre

The post development allowable discharge rate considered in the TBC application is assumed to be 0.15 cubic feet per second per acre (cfs/ac) which is equivalent to 96 cubic feet per second per square mile (csm). The basis for this design discharge would appear to be Collier County Ordinance 90-10, except that it exceeds "amounts determined in previous SFWMD permit actions". Moreover, according to Mr. Seal (Collier County Zoning and Land Development Review, 8/20/09 telecon), an applicant would be expected to demonstrate that there would be no adverse offsite impacts if a design discharge greater than the amount determined in a previous SFWMD permit action is used.

Since there do not appear to be any calculations of historic pre-development discharge based on streamflow monitoring, modeling, or other methods, the criterion associated with the SFWMD BOR Appendix 2 does no apply. In addition, the project does not discharge to one of the "county primary outfall canals" which have design discharges ranging between 25.6 and 28.4 csm. The currently permitted discharge is 0.027 cfs/acre (17.3 csm) for Camp Keais Agricultural Development (ERP No. 11-01178-S) and 0.032 cfs/acre (20.5 csm) for Shaggy Cypress Agricultural Development (ERP No. 11-00112-S). Thus, the TBC design rate of 0.15 cfs/acre *is about 5 times the permitted rates*; hence, it is hardly the more restrictive of the possible design rates that could have been selected.

The Conservancy would urge the SFWMD to require the applicant to limit their discharge rate to previous SFWMD permit action – to not increase the rate of discharge to any off-site areas including wetlands or receiving waterbodies.

<u>Inadequate Hydrologic Analysis and Need for Modification of Shaggy Cypress and Camp Keais Agricultural Developments ERPs</u>

The proposed development is entirely within the Big Cypress Stewardship District (BCSD) watershed, the runoff from which is currently discharged into Stumpy Strand and Camp Keais Strand primarily via an interconnected series of bermed detention areas (referred to as reservoirs) that route water generally from north to south. Project plans indicate that almost the entire perimeter of TBC will be formed by an existing network of agricultural berms. Some offsite flow will enter the north end, combine with internal runoff, and discharge through the south end of the development. Plans also indicate that TBC will be composed of eight drainage basins, the runoff from which is proposed to be discharged into an interconnected system of internal reservoirs. New berms would be constructed around the perimeter of four reservoirs internal to TBC (Figure 2). The tops of the berms (existing and proposed) are higher than the 100-year flood stage.

The application for TBC designates a conceptual, multi-phased project. There is no indication in Section A of the application that it represents either a new system or a

modification of the existing two agricultural development surface water management systems (SWMSs). Schematic diagrams of pre- and post-development SWMSs modeled using ICPR (Interconnected Channel and Pond Routing Model, Streamline Technologies, 2002) illustrate three outfalls (from RES 8, CKRES 5, and CKRES 4) where runoff would leave TBC. However in terms of the existing permitted SWMSs, the schematic diagrams illustrate a total of six outfalls (from RES 2, RES 6B, RES 8, CK RES 5, CKRES8, and Canal Reach 6) where runoff is discharged offsite into Stumpy and Camp Keais Strands.

The primary outfalls from which the largest portions of TBC drainage and the combined drainage from the agricultural development areas discharge are on the south ends of the respective watersheds (nodes labeled CKRES4 and Canal Reach 6, respectively). The southern extent of the Camp Keais Agricultural Development is located in S27/T49S/R28E, nearly 5 miles south of southern extent of TBC in S34/T48S/R28E (Figure 1). There is clearly a substantial amount of drainage area and existing stormwater management capacity within this intervening area. Future changes in land use within this area, such as another phase in this multi-phase development, could substantially influence the hydraulic performance of the existing SWMS. Those changes should be anticipated and addressed now.

In fact, this appears to have been recognized by SFWMD and is acknowledged by the Applicant in the March 12, 2009 response to Advisory Comment No. A4. It is not understood why the District has postponed a requested hydrologic analysis and modification of the ERPs for the Shaggy Cypress and Camp Keais Agricultural Developments, particularly since a much higher allowable discharge has been assumed for the design of the TBC SWMS. ICPR-generated design storm discharge hydrographs for the inflow to CKRES4 are not available for pre- and post-development conditions on the SFWMD Epermitting web site. It is not clear whether any consideration has been given to potential project impacts on the hydroperiod and conveyance of wetlands in down-gradient reservoirs.

Therefore, the Conservancy would request that the SFWMD require a hydrologic analysis and modification of the ERPs for the Shaggy Cypress and Camp Keais Agricultural Developments immediately, as well as a thorough analysis of the potential project impacts on the hydroperiod and conveyance of wetlands in down-gradient reservoirs.

Floodplain Encroachment and Inadequate Basin Storage

The applicant has not clearly demonstrated with reasonable assurance that there would be no net encroachment into the floodplain associated with the 100-year event which will adversely affect the existing rights of others. Per the District BOR paragraph 6.6, two aspects of floodplain encroachment are to be considered – storage reduction and flow interference (SFWMD BOR, page XA-1).

With regard to flow interference, there does not appear to be a potential for interference. The 17.0 foot NAVD weir crest elevation prescribed for control structure 2A located about 2,000 feet downstream from where runoff would enter TBC is about 3 feet higher than the inverts of the four existing box culverts on Oil Well Road. Although the higher crest evaluation will lengthen the hydroperiod of wetlands upstream from the structure

2A, it is presumed that the conveyance of this structure will be sufficient to avoid backing water up at Oil Well Road.

It is not clear how the proposed development berms adjacent to the internal reservoir (Figure 2) have been factored into the evaluation of pre-development basin storage. These proposed berms either do not currently exist or currently have top elevations lower than the predicted pre-development 100-flood stage. Thus, although the approach taken to calculate pre-development storage volume as the product of the drainage basin area and the different between the 100-year flood stage and the control elevation appears to be appropriate, it should still be clarified.

However, the proposed berms are designed to isolate the drainage basins from inundation by the 100-year flood. It appears that the calculated pre-development 100-year flood storage volume is a direct measure of the basin storage within the Camp Keais Strand flowway and floodplain that would be lost due to the TBC development. Regardless of a drainage basin being a net "exporter" or "importer" of basin runoff, paragraph 6.7 of the SFWMD BOR indicates that "provision must be made to replace or otherwise mitigate the loss of historic basin storage provided by the site." It is not clear whether, or how, this review criterion has been addressed.

There is also considerable variability in the quantity of pre-development storage volume calculated for this project. Two regional hydrologic and hydraulic models are referenced in the drainage calculations submitted with the application. The first is a model of Camp Keais Strand Flowway prepared using the proprietary code MIKE SHE / MIKE 11 (Hydrogeologic, 2006), and the other is the Ave Maria Basin model which includes Camp Keais Strand Flowway, prepared by Tomasello Consulting Engineers, using their proprietary code S2DMM.

Very little information has been provided to describe the development, calibration and validation of the S2DMM model; whereas a complete technical contract report is available for the MIKE SHE application. MIKE 11 is a modification of MIKE SHE which zooms in on the northern portion of Camp Keais Strand including all of the BCSD. The MIKE 11 model utilizes a horizontal discretization of 500 feet, compared to the S2DMM model which utilizes discretization of 1,000 feet.

Floodplain storage was first addressed by the applicant in an August 8, 2008 response to a District RAI. Reference is made in the response to Figure 3.22 of the report by Hydrogeologic and simulated, pre-development, 100-year flood water depths in the area of TBC being 0.5 feet higher than natural grade. The figure actually illustrates that simulated water depths over much of the TBC, excluding the reservoirs, is between 0.25 and 0.50 feet (Figure 3). The total pre-development storage volume is 1,118 acre feet (ac-ft).

The December 17, 2008 response to another District RAI indicates that pre-development, 100-year floodplain storage calculations were revised and are now based on the Tomasello model. The 100-year floodplain stages listed for the eight TBC basins range between 0.05 and 2.5 feet higher than natural grade, the average difference being 1.0 feet. This yields a volume of 1,805 ac-ft which is 686 ac-ft greater than the pre-development floodplain storage volume calculated using the MIKE SHE / MIKE 11 modeling results.

No explanation is provided regarding the difference in 100-year floodplain stages calculated using these two regional hydrologic and hydraulic models. The Camp Keais Strand Flowway project was performed to provide a technical basis for an action plan for the restoration of natural flow conditions within the Camp Keais Strand area. The report summary indicates that even with improvement, the Barron-Collier farm structures "represent a major restriction in the system under high-flow conditions." Furthermore, results of the simulation of a projected year 2050 land use which assumes that a large portion of BCSD becomes urban area indicate a potential increase in overland flow depths of up to 0.5 feet or more in Golden Gate Estates and farm land converted to other uses outside Camp Keais Strand.

Therefore, the Conservancy believes that it is essential that the apparent deficiency in floodplain storage be addressed, with additional compensatory storage required if justified. Additionally, the difference in results obtained using these two models should be explained, or some rationale be provided for selecting one model over the other for purposes of evaluating potential regional impacts. We would also urge the SFWMD to require such information from the applicant such as to describe the development, calibration and validation of the S2DMM model.

Insufficient Hydroperiod Analysis for Assessing Impacts to Wetlands

Paragraph 4.2.2.4 of the District BOR indicates that "increasing the depth, duration, or frequency of inundation through changing the rate or method of discharge of water to wetlands....must also be addressed to prevent adverse effects to functions that wetlands and other surface waters provide to fish and wildlife and listed species."

The proposed project will replace the pumped drainage systems in the existing farm fields with a gravity drainage system constructed within each of the eight TBC drainage basins. Runoff from the drainage basins will discharge into a main internal system of wetland areas that conveys runoff to the south end of the development where it would be discharged in the existing Camp Keais Agricultural Development SWMS.

As mentioned earlier in this letter, the allowable discharge rate assumed for the design of the drainage basins is about 5 times the existing permitted allowable discharge for this area. The project has been extensively evaluated for the hydrologic and hydraulic response of runoff to relatively infrequent design storms such as the 25- and 100-year floods. However it does not appear that the hydroperiod of wetlands within the internal system of reservoirs has been evaluated for potential change in depth, duration, or frequency of inundation associated with the more frequent "pulsing" of runoff associated with the lower-volume rainfall that occurs more frequently throughout a year. This is a particularly critical analysis because the applicant intends to utilize these internal conversation areas for mitigation for short hydroperiod dependent species, in addition to their use as stormwater attenuation areas (such as Conservation Area south of Drainage Basin 2).

The Conservancy is concerned that excessive discharge of water into the internal WRA preserves and into the Camp Keais strand will result in hydroperiod alterations. Mitigation value for impacts to wading birds and other wetland-dependent species through the enhancement of internal preserve wetlands may be lost if water depths and hydroperiods are altered so that utilization by wading birds is negated. The USFWS also raises concerns regarding how the site surface water management system will affect

downstream hydrology, including discharge rates and timing of water to the Florida Panther National Wildlife Refuge[1].

Therefore, the Conservancy would urge the SFWMD to require the applicant to provide a thorough analysis of the impacts of the proposed discharge rate on the hydroperiod of wetlands both within project area and offsite for potential change in depth, duration, or frequency of inundation as a result of the proposed development.

Inadequate Water Quality Analysis

There are two items that should be evaluated regarding water quality analysis. The first item is that the basis for the SCS curve number of 91 prescribed for the row crop land use in the analysis of pre-development nutrient loads should be described. The value used is quite high and comparable to the value of 92 prescribed for the water management lakes in the post development analysis. The high curve number for row crops results in considerably more runoff being predicted for pre-development conditions than for post development. For example, the water quality analysis submitted earlier this year lists a pre-development annual site runoff volume of 3,392.97 ac-ft/yr for Discharge Basin 1 compared to a post development annual site runoff volume of just 621.32 ac-ft/yr (*Town of Big Cypress Water Quality Analysis, Agnoli Barber & Brundage, February 4, 2009*) . This projected 82-percent reduction in annual runoff volume seems very unlikely.

The current row crop runoff number compares to the range of 89 to 91 reported for the C-139 basin (*C-139 Basin Phosphorus Water Quality and Hydrology Analysis, A.D.A. Engineering, 2006*) for row crops associated with SCS hydrologic group D soils characteristic of poorly drained soils with a high water table. However the existing fields include internal tertiary drainage ditches and water management practices which lower the water table and facilitate infiltration. A lower curve number reflective of this existing condition is more appropriate. For example, the same citation lists a curve number range of 78 to 81 for the more highly drained row crop soils of hydrologic group B. The SCS soils map for the project area may list a dual hydrologic group classification such as B/D, in which the case the group B properties would be more appropriate. Likewise, any curve numbers used in the evaluation of pre-development flood volumes should be compared with those used in the water quality analysis.

The second item relates to a Technical Memorandum dated June 25, 2009 from Dr. H. Harper, P.E. to the Florida Stormwater Rule Working Group that may be relevant to this application. As the Harper report is cited as the reference for the water quality evaluation prepared for this application (*Town of Big Cypress Water Quality Analysis,* Agnoli, Barber & Brundage, February 5, 2009), it is appropriate that his guidance be used in applying the methodology in the report he authored.

The author reports an apparent data anomaly in the relationships between percentage Direct Connected Impervious Area (DCIA) and removal efficiency in the report *Evaluation of Current Stormwater Design Criteria within the State of Florida* (Environmental Research & Design, June 2007, Appendix D). The author suggests that one of the options to "avoid...potential abuse" of the anomaly is to limit the minimum DCIA percentage considered in an evaluation to 10 or 15 percent. This would in effect

[1] FWS letter dated November 18, 2008.

ensure that credit was not being awarded for a benefit that is in fact not being provided. In the proposed Town of Big Cypress application, 8 drainage basins have 0% DCIA. It is recommended that the water quality analysis be re-evaluated with consideration of the limiting DCIA percentage recommended by Dr. Harper to the Florida Stormwater Rule Working Group. Therefore, the Conservancy would urge the SFWMD to require the applicant to redo the water quality analysis with those DCIA percentages adjusted to a minimum of 10%.

Also of concern is the depth of the stormwater treatment lakes. EPA has raised concerns regarding the effectiveness of constructed wet ponds deeper than 6 to 8 feet[2]. Generally, ponds deeper than this will stratify, resulting in less effective stormwater treatment. Due to their extreme depths, it is likely the deeper portions of the proposed lakes may become anaerobic – perhaps contributing to low DO impairments. Similarly, we are concerned that the pollutants in this stormwater pose a risk to ground water quality, as the soil borings provided by the applicant illustrate the permeable and uncontained nature of the soil on-site. Therefore, the Conservancy would recommend that the lake depth limitations be limited to 8 feet or if they are not, that aeration devices be required and the applicant not be allowed to incorporate the volume below 8' in their water quality calculations.

Inadequate Listed Species and Preserve Management

Although the applicant continues to work with the FWC and other entities on outstanding issues, the Conservancy finds that the Listed Species Management Plan dated June 2009 and the Wetland Mitigation/Monitoring/Maintenance Plan dated March 12, 2009 to be incomplete and that they do not adequately address either the Conservancy's concerns nor the concerns introduced by the FWC or the USFWS.

Both the FWC and the USFWS have concerns regarding the management of internal preserves, as well as the Stewardship Sending Areas (SSA) proposed as mitigation for the project. The FWC has requested SSA management plans utilizing their Objective-Based Vegetation Management Plan, which the applicant has not yet provided.

The Conservancy supports the FWC's efforts to obtain a 500-foot buffer between the Town footprint and the proposed SSA areas. A buffer to "further facilitate and reduce the disturbance from the development to the wildlife corridor[3]" is appropriate on all sides of the development, not just to the north and south. As proposed now, there is no buffer or fire break between the managed area and the Town site. Furthermore, the 500-foot buffer accepted by the applicant to the north and south of the project[4] should be placed under a conservation easement to prevent future urbanization of these critical buffer areas.

The Conservancy also has additional concerns regarding listed species surveying. The applicant reports several (approximately eight) observations of the threatened sandhill crane, however, the reports do not specify if what was observed were adults or juveniles.

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[2] EPA External Peer Review of Evaluation of Alternative Stormwater Regulations for Southwest Florida. P. 30.

[3] Florida Fish and Wildlife Conservation Commission letter to SFWMD dated September 16, 2008.

[4] Passarella & Associates letter to Florida Fish and Wildlife Conservation Commission dated July 28, 2009. p.

If flightless young are observed, this is indicative of nesting on the site[5]. Additionally, the provided burrowing owl survey is unsatisfactory. Appropriate burrowing owl surveys require observation at least five consecutive days; only two days were provided in the survey submitted[6]. Management plans for sandhill crane and burrowing owl have not been provided. Surveying for indigo snake is also inadequate. Standards for surveying include setting up drift fences at least two [500 feet apart] per 100 acres of habitat[7]. The lack of adequate gopher tortoise surveying makes sufficient surveying for the indigo snake all the more critical.

Additionally, surveying and/or management actions for other imperiled species is completely absent. No surveying for the threatened Everglades mink took place although they have been documented to occur just south of the project in the Florida Panther National Wildlife Refuge. Surveying for the mink and other imperiled small mammals should be conducted.

The Conservancy is also very concerned about the project's impacts to the crested caracara. While the report *attempts* to establish that the nest observed in February 2009 has been destroyed, caracara "exhibit high site...fidelity[8]." If nests become damaged, "the caracara will usually rebuild the nest during the next nesting season in the same tree or in an adjacent tree. In certain circumstances, several years may pass before a new nest is constructed. A nest should not be considered abandoned until it is not used for three consecutive breeding season or not other active nests found within 0.5 km of the nest[9]." This nest is considered active until it meets the requirements established by the USFWS to be declared abandoned. Therefore, the District should consider that proposed development and construction activities within the caracara buffer zones may adversely impact this wetland-dependent species.

Previously Raised Issues which Remain Unaddressed

Many issues from our previous letter, dated May 13, 2009, do not appear to have been adequately resolved. While the applicant has obtained a Request for Additional Information (RAI) extension, we hope that these concerns, in addition to the new issues described in this letter, will be fully addressed by the SFWMD and the applicant prior to the permit application being deemed sufficient or complete. Please refer to our previous letter for more detail on the following issues which appear to remain unaddressed:

- Failure to avoid and minimize impacts

  The U.S. Fish and Wildlife Service (USFWS) has requested an alternatives analysis that included other applicant-owned lands north of Oil Well Road that "may be more suited to a development of this sort[10]." Likewise, the applicant has

[5] Beever (2006). Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects.
[6] Beever (2006). Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects.
[7] Beever (2006). Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects.
[8] Morrison (2001). Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara in Florida. P. 3.
[9] FWC South Florida Ecological Services Office (April 20, 2004). Species Conservation Guidelines South Florida: Audubon's Crested Caracara.
[10] FWS letter dated November 18, 2008.

not met the requirement, per the SFWMD BOR §4.3, that they have properly "eliminated or reduced adverse impacts[11]."

- Failure to allow consideration for all future phases and demonstrate that future phases will meet permitting criteria

  We have submitted information that demonstrates the intent of the applicant to develop other areas within the Big Cypress Stewardship District in the future. The applicant has not submitted information to meet the requirement under the BOR §4.2.7, whereby the District can review the secondary impacts of all phases in one conceptual permit, and in which the applicant can demonstrate assurances that all phases will comply with the BOR.

- Failure to modify existing permits in conjunction with the Town of Big Cypress permit review

  The Shaggy Cypress and Camp Keais agricultural permits that overlay the footprint of the Town of Big Cypress considered in this permit application were both modified in February, 2009. The permit does not address the modifications that would be necessary to these existing permits should the Town of Big Cypress be permitted. Furthermore, the alignment of Oil Well Rd. is proposed to be altered from its currently permitted alignment. There are wetlands impacts associated with this realignment that have not yet been reviewed. The agricultural permits, as well as the Oil Well Rd. permit, should be modified in conjunction with the Town of big Cypress permit.

- Failure to provide appropriate mitigation for proposed impacts

  It is important that the District review these overlapping applications simultaneously as our research has shown that some areas of internal WRAs – now considered as mitigation for the Town of Big Cypress- have been considered secondarily impacted by activities authorized by the agricultural permits. Additionally, area which is now considered a Stewardship Sending Area (SSA15) has been proposed as mitigation for both impacts under the Camp Keais agricultural development permit, as well as the Town of Big Cypress. Furthermore, we find that the applicant fails to adequately address impacts to wildlife from roads as instructed in BOR §4.2.7(a). While impacts to large mammal movements and connectivity of habitat would be reduced should the project be moved north of Oil Well Rd., as proposed, the applicant should provide compensatory connectivity where it will adequately mitigate large mammal movement restrictions proposed by this project.

- Failure to provide adequate upland buffer and preserve requirements

  The Conservancy disagrees that fencing and berm plantings compensate for impacts resulting from inadequate upland buffers. Furthermore, additional upland preserves should be protected on-site, particularly because of the size of the proposed project. Less than 40 acres of upland buffers and preserves are being proposed and upland buffer areas are important habitat components for wetland-dependent species, many of which spend part of their life cycles in adjacent uplands.

[11] Basis of Review (BOR) at §4.3.

- Failure to adequately manage preserves

  Fire management is critical, even in most wetland habitats. Both the Florida Fish and Wildlife Conservation Commission (FWC) and the USFWS have requested preserve management plans that addresses fire regime, including location of fire breaks. The applicant has not provided information regarding management in the internal WRA preserve areas, nor in the adjacent SSA areas. Additional issues relating to preserve management are identified above.

- Failure to provide sufficient listed species surveying

  Considering that the site currently has almost 200 acres of suitable gopher tortoise habitat, the District should request a gopher tortoise survey that adequately surveys these areas for evidence of gopher tortoise. A gopher tortoise survey was also requested by the USFWS[12] and has not been provided by the applicant. Because the authority to regulate the gopher tortoise rests with the state of Florida, it is critical that the District ensure that proper surveying for this species has been conducted. Additional issues relating to listed species surveying were described above.

- Failure to provide sufficient stormwater management

  The applicant's analysis of nutrient removal does not meet the load reduction rate of 80% as established by the Florida Administrative Code 62-40.432 and does not meet §401 certification standards which show compliance under the Clean Water Act. Additional issues relating to stormwater management are outlined above.

- Failure to provide assurance of hydroperiod consistency

  The applicant has not adequately provided assurances under BOR §4.2.2.4 that the project will not alter the hydroperiod of on-site and surrounding wetlands. This is particularly crucial as the site and its surrounding wetlands provides habitat for a number of imperiled wading birds, and is within the Core Foraging Area of three woodstork rookeries. Additional concerns regarding hydroperiod considerations are listed above.

- Failure to minimize water use levels

  The proposed Phase I will utilize over half a million gallons of water a day and over 1.2 million gallons per day during Phase II. Although drawing from the Lower Hawthorne, the Conservancy is concerned about the cumulative impact of drawdown on our aquifers. The applicant should simultaneously provide the District with a consumptive water use permit application.

- Failure to meet the Public Interest Test

  The Conservancy believes that the applicant has clearly not demonstrated that this project will not "adversely affect the conservation of fish and wildlife, including endangered and threatened species, or their habitats,[13]" which is one of the requirements that proposed projects must meet under the Public Interest Test.

[12] FWS letter dated November 18, 2008.
[13] Basis of Review (BOR) at §4.2.3.

Conclusion

The Conservancy of Southwest Florida would respectfully request the SFWMD to consider the implementation of the recommendations outlined in this and previous comment letters with regard to the proposed Town of Big Cypress project.

From the substantial information in the documents reviewed, many requirements established by the Basis of Review have not been met. The rate of discharge proposed is inconsistent with the BOR and reasonable assurance has not yet been demonstrated with regard to floodplain encroachment and historic basin storage. The hydrologic and hydraulic assessment of the Camp Keais Strand Flowway prepared in 2006 for SFWMD demonstrates that the hydrology of the strand has been affected by roads and agricultural development. The assessment was initiated to develop an action plan for the restoration of natural flow conditions. Therefore, exceptional care should be taken to ensure that the proposed project does not undermine efforts to restore natural flow conditions, as well as compromise the ecological integrity of natural resources both on and off-site.

Additionally, sufficient elimination or reduction of adverse impacts per the BOR has not been attained. As well, reasonable assurance that the project will not adversely impact the value of functions provided to fish and wildlife and listed species by wetlands and other surface waters has not been provided. As a result, we would urge the SFWMD not recommend approval of this permit application until all of these concerns have been adequately addressed. Thank you for your time and consideration in this matter and please feel free to contact me (239 262-0304 x250) or Amber Crooks (at x286) if you have any questions or would like to discuss further.

Sincerely,

Jennifer Hecker

Jennifer Hecker
Natural Resource Policy Manager

cc: Carol Wehle, SFWMD
Bill Foley, SFWMD
Ken Haddad, FFWCC
Mary Ann Poole, FFWCC
Stephanie Rousso, FFWCC
Jennifer Goff, FFWCC
Paul Souza, USFWS
Victoria Foster, USFWS
Layne Hamilton, USFWS
David Hobbie, USACOE
Skip Bergman, USACOE
Jim Giattina, US EPA
Veronica Fasselt, US EPA
Thomas Welborn, US EPA

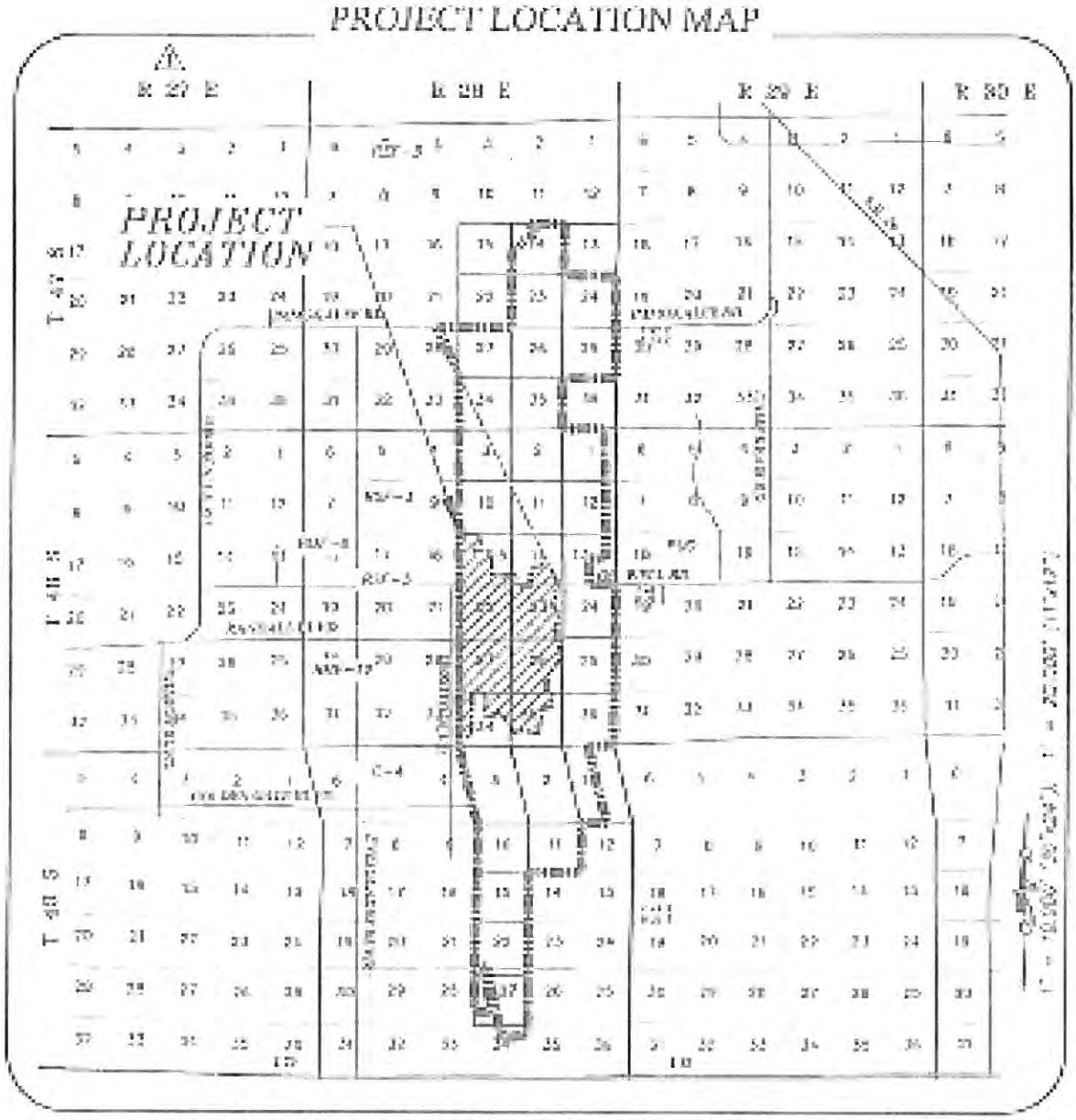

Figure 1. Location of the proposed Town of Big Cypress (hatched area) within the boundary of Big Cypress Stewardship District (dashed bold line) [Source: Agnoli, Barber, Brundage (March 3, 2008)]

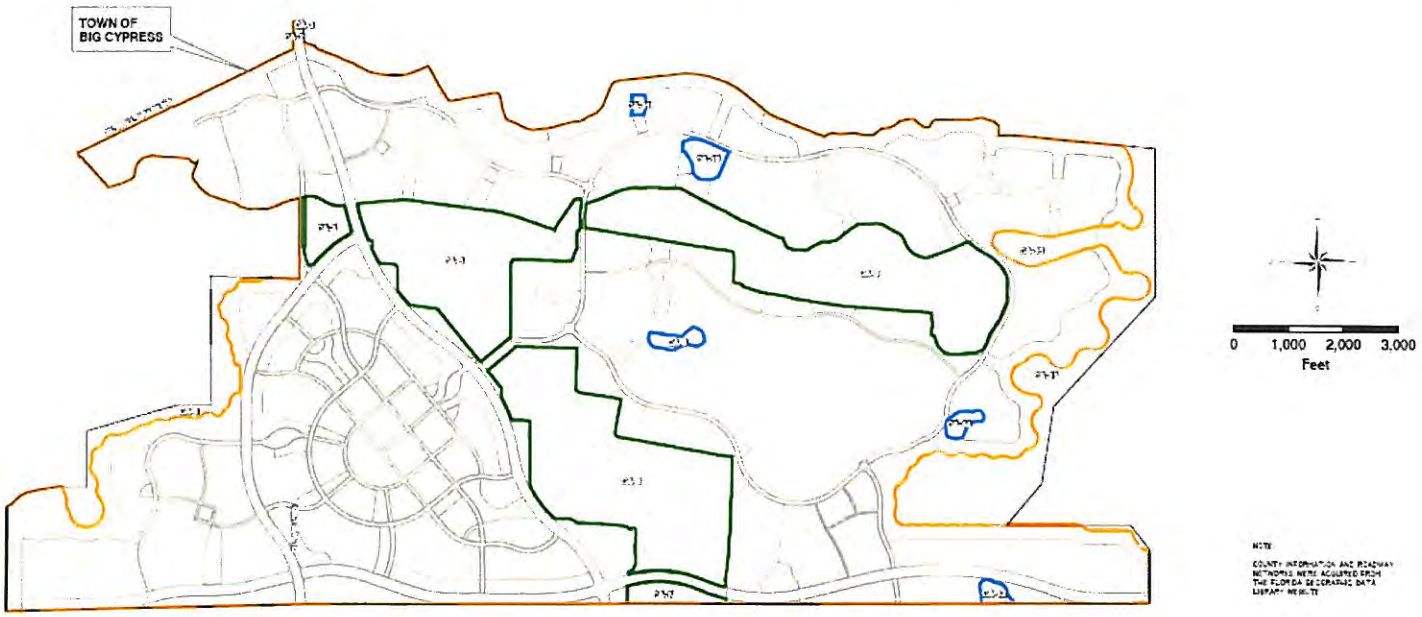

Figure 2. – Location of existing agricultural berms that will remain (gold) and proposed berms around internal reservoirs (green)
[Source: Passarella & Associates (March 5, 2009)]

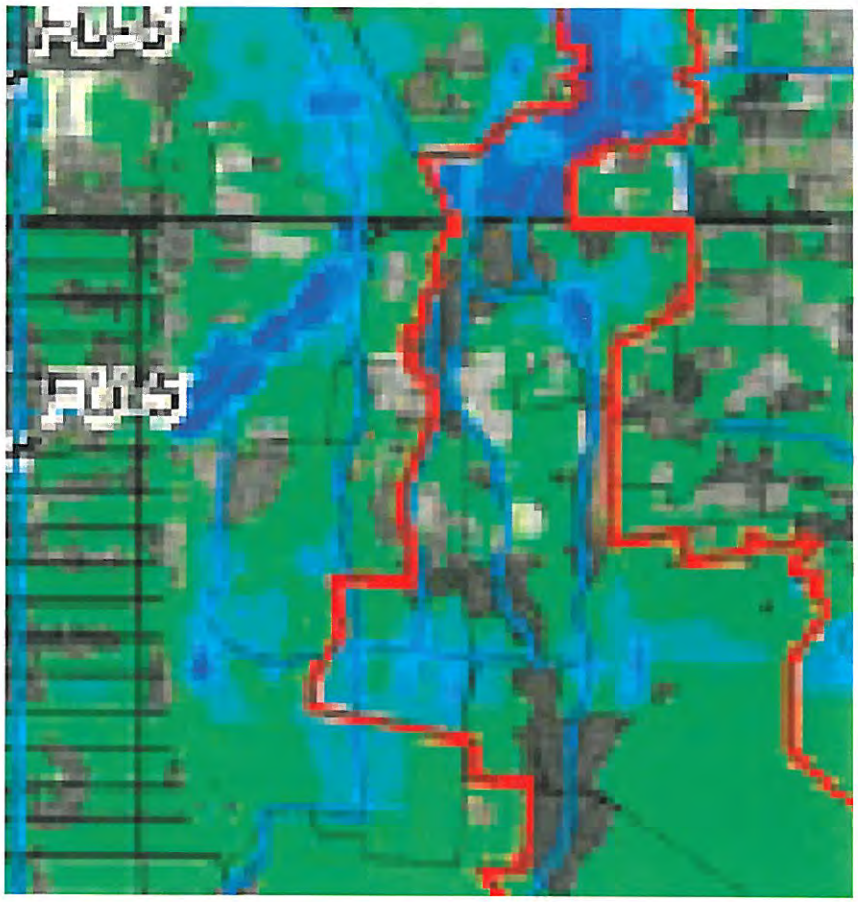

Figure 3. Maximum existing conditions, 100-year flow, overland flow depth simulated using MIKE SHE / MIKE 11

[Source: HydroGeoLogic (August 2006, excerpt from Figure 3.22)]

CONSERVANCY
Of Southwest Florida

Preserving Southwest Florida's natural environment and quality of life ... now and forever.

May 13, 2009

South Florida Water Management District
Lower West Coast Regional Service Center
Attn: Holly Bauer-Windhorst, Environmental Analyst
2301 McGregor Blvd.
Ft. Myers, FL 33901

RE: Town of Big Cypress, ERP Application #080103-6

Dear Ms. Bauer-Windhorst:

The Conservancy of Southwest Florida, representing our over 6,000 members, writes with continued concerns regarding the proposed Town of Big Cypress development (ERP application #080103-6). Even after several Requests for Additional Information (RAI) to the applicant, we believe the development, as proposed, still fails to meet the South Florida Water Management District Basis of Review (BOR) and therefore no permit should be granted until substantial changes in the design and location of the development are made.

Failure to Avoid and Minimize Impacts

The BOR § 4.3 states that "mitigation will be approved *only after* the applicant has complied with the requirements of subsection 4.2.1 regarding practicable modifications to *eliminate or reduce adverse impacts*" (emphasis added). The applicant has not proven that the substantial direct and indirect impacts to on-site and off-site wetlands, as well as the wetland-dependent species that utilize these areas, are unavoidable. The applicant proposes to directly impact almost 60 acres of wetlands, and will indirectly impact over 600 acres of wetlands in the internal Water Retention Area (WRA). The proposed cite is heavily utilized by many protected wetland dependent species, including the critically-endangered Florida panther. The applicant could avoid these impacts by transferring the project to a site that they already own to the north of the proposed footprint (see Exhibit A). This alternative site has comparable land and similar acreage and is open for development under the Rural Land Stewardship Program (RLSP). Additionally, this site has minimal internal wetlands that are more hydrologically isolated than in the current footprint, is outside of the panther's primary habitat zone, and has no documented panther telemetry. Requiring the applicant to move the project footprint to these lands north of Oil Well Road is a practicable solution and will allow the project to meet the BOR requirements of avoiding and minimizing impacts prior to mitigation for unavoidable impacts.

Lack of a Conceptual Permit for All Phases of Development

Although the US Fish and Wildlife Service in their November 18, 2008 Request for Additional Information asked the applicant to consider the area north of Oil Well Road as an alternate site , the applicant has not provided any evidence that this less-impactive alternative has been considered. It is evident that the applicant plans on completing several phases of development within the entirety of the Big Cypress Stewardship District with both sites, as well as a third southern footprint, to be developed in the future. Expectations of future development in these areas are apparent in submitted documents utilized in Collier County growth management planning, as well as reports from the news media (see Exhibit B).

Because the majority of the current phase as well as the entirety of the future "southernmost villages" phase of the Big Cypress Stewardship development is primary zone panther habitat, we believe that the applicant would have difficulty meeting permitting criteria. Per the BOR § 4.2.7: "system expansions and future system phases will be considered in the secondary impact analysis, and if the District determines that future phases of a system involve impacts that appear not to meet permitting criteria, the current application shall be denied unless the applicant can provide reasonable assurance that those future phases can comply with permitting criteria. One way for applicants to establish that future phases or system expansions do not have adverse secondary impacts is for the applicant to obtain a conceptual approval permit *for the entire project*" (emphasis added). Based on this regulation and to facilitate the District's ability to fully review all impacts, the applicant should withdraw the current permit application and submit a conceptual permit application for the entire project, including all phases of the development.

Lack of Modification of Oil Well Road Permit

As the District has required permit completion for the Shaggy Cypress agricultural ERP permit (#11-00112-S) and the Camp Keais agricultural ERP permit (#11-01178-S), which overlap with the proposed Town of Big Cypress footprint, the modification of the Oil Well Road Widening permit #11-01745-P should be required to be completed prior to moving forward with review of the Town of Big Cypress. The current permit provided for the Oil Well Road Widening project is linear and does not account for the revised alignment proposed through the town center of the development. Moreover, 5.19 acres of wetland impacts are associated with this new alignment but have been excluded from review at this time.

Furthermore, connectivity for wetland-dependent species from the northern portion of the project across Oil Well Road has not been provided, as wildlife crossing #2 is proposed as part of the Oil Well Road permit – not the Town of Big Cypress. As the Oil Well Road footprint overlaps with the proposed Town of Big Cypress and provides the missing wildlife crossing needed to minimize secondary impacts to small and medium wetland-dependent species, the District must require the applicant –in conjunction with Collier County (the permit holder for the current Oil Well Road Widening project) to submit a modification request for review. This would ensure wildlife crossing is achieved according to the plans prior to moving forward with review of the proposed Town of Big Cypress.

Inappropriate Mitigation for Proposed Impacts

The applicant has not provided sufficient mitigation for proposed impacts. Furthermore, we are concerned that the lands proposed as mitigation are encumbered through their use as mitigation for other projects, and that lands proposed as mitigation fail to provide full functionality for all wetland-dependent species under the District's review.

The same 18.74 acres of WRA wetlands that are being considered as mitigation for this project were previously deemed secondarily impacted by the Camp Keais Agricultural Development (permit #11-01178-S) and were subsequently mitigated. If impacts to these 18.74 acres of wetlands necessitated the need for mitigation, it should not be considered as mitigation, itself, for the Town of Big Cypress project as well. Similarly, Stewardship Sending Area (SSA) 15 is proposed as additional mitigation lands for the Town of Big Cypress extensive impacts to the Florida panther, however, part of this area was proposed as mitigation for the Camp Keais Agricultural Development. Mitigation areas for wetland impacts consider both impacts to wetland systems and impacts to wetland-dependent species, therefore this area of SSA15 has been proposed as panther mitigation for two distinct projects (see Exhibit C). This results in a "double-dipping" scenario where credit is granted twice for only one area of preserved land.

According to the BOR § 4.2.7(a), "impacts to wildlife from vehicles using proposed roads in wetlands" shall be considered as secondary impacts. The applicant has not proposed adequate mitigation for these impacts. The 4 foot x 6 foot crossings may provide connectivity for small- to medium-sized animals, however, the plan fails to provide connectivity for all wetland-dependent species, including the endangered Florida panther and the threatened Florida black bear. The intentional deterrence of these wide-ranging mammals from the WRA preserve area should reduce the value of these lands in regards to its UMAM assessment. The proposed mitigation wetlands #8, 11, and 17 were assessed and presented to the District with high UMAM scores (all assessed at 9 out of 10) and stated anticipated use by listed species *including the panther and black bear*. The UMAM scoring for these wetlands needs to be reviewed and UMAM scores deflated as these areas are not intended to be nor will be used by panther or other large wildlife. The District should review proposed conservation areas for their utilization and value to *all* species the District is subject to protect under the BOR, as "aquatic or wetland-dependent fish and wildlife are an integral part of the water resources which the District is authorized to protect under Part IV, Chapter 373[1]" of the Florida Statutes and "species which are listed as threatened, endangered or of special concern are particularly in need of protection[2]."

Failure to Meet Basis of Review Upland Buffer and Upland Preserve Requirements

The BOR clearly establishes in 4.2.7(a) that "secondary impacts to the habitat functions of wetlands associated with adjacent upland activities will not be considered adverse if buffers, with a minimum width of 15' and an average width of 25', are provided." The

[1] SFWMD Basis of Review 4.2.7.
[2] SFWMD Basis of Review 4.2.7.

need for an upland buffer is required *in addition* to swale-and-berm systems[3]. In many areas proposed by the applicant, multi-use and residential development is proposed adjacent to WRA preserve area without adequate buffers. These standards should be required to protect the WRA preserve area as well as adjacent off-site wetlands. Berm plantings and wildlife fencing do not adequately compensate for secondary impacts related to lack of adequate upland buffers[4]. While the berms may assist with reduction of water quality impacts to the WRA conservation area and off-site wetlands, they will never replace the upland native habitat that many wetland-dependent species utilize for their life history requirements and daily needs.

Upland habitats are essential for most wetland-dependent species. Florida Administrative Code rule 62-345.200, regulating UMAM policies, requires assessment of the "ecological value" of impacted areas and mitigation areas, which is defined as: "value of functions performed by *uplands*, wetlands, and other surface waters to the abundance, diversity, and habitats of fish, wildlife, and listed species. Included are functions such as providing cover and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain supports...." Uplands value to wetland systems is scientifically supported and benefits water quality and quantity issues, energy and nutrient systems, and wildlife habitat[5]. All the wetland-dependent species documented to occur on the site, including the caracara, sandhill crane, woodstork, limpkin, little blue heron, tricolored heron, white ibis, snowy egret, roseate spoonbill, Big Cypress fox squirrel, black bear, Florida panther, and American alligator will utilize uplands adjacent to wetlands as an essential component of their habitat.

Clearly, full functionality of mitigation lands to wetland-dependent species is not being provided by the applicant, with a total of only 14.34 acres of upland buffer and 24.05 acres of upland preserve proposed for this 3,699 acre development. The BOR at 4.3.2.2(d) provides guidelines regarding preserves intended as mitigation. The Town of Big Cypress fails to meet the upland preservation ratio established in this section, which states: "many wildlife species that are aquatic or wetland dependent spend critical portions of their life cycles in uplands.... the ratio guideline for upland preservation will be 3:1 to 20:1 (acreage of uplands preserved to acreage impacted)." The applicant has failed to alter their site plan with additional uplands preserved despite the District's continued requests. The Conservancy supports the District's recommendation that the applicant "preserv[e] additional uplands to provide long-term habitat support for wetland-dependent species[6]."

Failure to Adequately Manage Proposed Preserves

Furthermore, the Conservancy has concerns regarding management of preserve areas. The applicant does not plan on utilizing fire to maintain their upland preserves. When requested to include fire breaks and a fire management plan for the upland preserves, the applicant simply withdrew its commitment to using prescribed fire on its upland

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[3] SFWMD BOR at P-1 and P-2 "Typical Wetland Preserve Cross Section with Water Quality Swale and Berm".
[4] Request for Additional Information dated April 10, 2009, Question 3.
[5] Taylor, et al (1999). The Vital Link Between Land and Water: The Importance of Uplands for Protecting Wetland Functions. University of Florida Institute of Food and Agricultural Sciences (IFAS).
[6] Request for Additional Information dated February 1, 2008, Question 5a.

preserves[7]. Both the Florida Fish and Wildlife Conservation Commission (FWC) and the US Fish and Wildlife Service (FWS) have also requested that the project utilize prescribed fire in habitats were appropriate, to have the fire management plan approved by the wildlife agencies, and to plan for smoke corridors[8]. Therefore, the Conservancy recommends that the South Florida Water Management District require prescribed fire management of the Town of Big Cypress preserves, including fire breaks and a fire management plan, as a special permit condition.

Insufficient Surveying and Management of Listed Species and Their Habitats

The applicant fails to adequately survey for all potential listed species that may occur in this sensitive part of Collier County. The applicant states that no gopher tortoises were documented on the site, however, the Conservancy can find no documentation that the property was adequately surveyed for this threatened species in their Conceptual Wetland Mitigation/Monitoring/Maintenance Plan dated December 17, 2008. The Town of Big Cypress site contains 183 acres of potential habitat for gopher tortoises. According to the Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects[9], at least 15% of suitable habitat should have been surveyed. A gopher tortoise survey was also requested by FWS in their letter[10]. Therefore, the Conservancy recommends that the South Florida Water Management District require the applicant to conduct a gopher tortoise survey on at least 28 acres of the suitable gopher tortoise habitat onsite and submit that for agency review.

The Conservancy believes the District should also request a nesting season red-cockaded woodpecker survey, following the Beever surveying guidelines, as the site contains over 60 acres of pine flatwoods and over 60 acres of hydric pine which is potentially suitable for red-cockaded woodpecker use. Additionally, a survey for the Southeast American Kestrel should be completed, following the Beever guidelines, between April and August. The applicant should also address surveying for the threatened Everglades mink, (which is documented to occur just south of the project in the Florida Panther National Wildlife Refuge), as well as the Sherman's short-tailed shrew, as both are imperiled species. Furthermore, the applicant should re-survey for imperiled limpkins and sandhill cranes, as "the presence of flightless young limpkins and Florida sandhill cranes is considered presumptive of a nest being present[11]," as no nests are shown on the applicant's submitted wildlife survey documents to date.

The application claims that there is no documented nesting by the threatened Audubon's crested caracara on the site; however, the submitted wildlife surveys show a significant amount of caracara activity on the site (about seven observations), particularly in the southern portion of the property. Caracara usually forage within 1.2 to 1.9 miles from

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[7] Request for Additional Information applicant response March 20, 2008, Question 6e.
[8] FWC letter dated September 16, 2008; FWS letter dated November 18, 2008.
[9] Beever, J (2006). Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects.
[10] FWS letter dated November 18, 2008.
[11] Beever, J (2006). Standardized State-Listed Animal Survey Procedures for Use in the Review of SWFRPC Projects. p. 6.

their nest[12]. Noting the frequency and distribution of the sightings on the site, it is likely that there is a nest in close proximity to the development site. Because the applicant owns the land directly to the north, east and south of the proposed footprint, the applicant should extend their survey at least another 4,920 feet into their adjacent property to survey for potential caracara nests. The Service defines a primary zone of 985 feet and a secondary zone of 4,920 feet from the nest tree. These buffer zones are intended to minimize disturbance around the nest and protect the caracara from a "taking". This information is vital to adequately protect caracara habitat, as any nest lying within 4,920 feet outside of the proposed development boundary, but on lands within the applicant's ownership, could affect standards of appropriate vegetation removal and construction activities within buffer zones. While the secondary caracara buffer zone has been defined as 4,920 feet from a nest[13], the applicant only proposes to survey up to 3,300 feet. The FWS document, "Species Conservation Guidelines South Florida Audubon's Crested Caracara," clearly states that if a nest is off-site, but the secondary zone overlaps with the project, "the off-site management zone area should be protected through conservation easements" and additional conservation measures may be needed to ensure that the project is not likely to adversely affect the species[14]. Therefore, the applicant should extend their survey at least another 4,920 feet into their adjacent property to survey for potential caracara nests.

Clearly, the applicant needs to provide additional listed species and wildlife information. The applicant should also provide management plan(s) that address all of the protected species occurring or potentially-occurring on the site, including wood storks, burrowing owls and sandhill cranes, which are largely ignored in their current mitigation plan. The management plan for listed species also needs to be refined for other species; for example, the mitigation plan states that "no clearing will take place within 125 feet of an identified Big Cypress fox squirrel nest", however, one pair of Big Cypress fox squirrel requires at least 25 acres of suitable habitat[15].

Without these surveys, it is not possible to conduct a proper "assessment of impacts expected as a result of proposed activities on the values of functions that any wetlands or other surface water provides to fish, wildlife, and listed species" as required by Section 4.2.2.3 in the ERP Basis of Review. This section specifically states that the SFWMD will consider fish and wildlife utilization including the "use of the wetlands or other surface water for resting, feeding, breeding, nesting, or denning by fish and wildlife, particularly those which are listed species." Therefore, the Conservancy recommends that these additional surveys and management plans be required and submitted for agency review prior to the application being deemed complete.

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[12] Morrison, J. (2001). *Recommended Management Practices and Survey Protocols for Audubon's Crested Caracara in Florida, Technical Report No. 18* (produced for the Florida Fish and Wildlife Conservation Commission).

[13] US Fish and Wildlife (2001). Species Conservation Guidelines South Florida Audubon's Crested Caracara. South Florida Ecological Services.

[14] US Fish and Wildlife (2001). Species Conservation Guidelines South Florida Audubon's Crested Caracara. South Florida Ecological Services. p. 7.

[15] Collier County (Updated March 2005). Big Cypress Fox Squirrel. <http://www.colliergov.net/Index.aspx?page=427>.

Insufficient Stormwater Management

The applicant submitted their water quality analysis based on the "Harper 2007 Report". This report has not been independently scientifically peer-reviewed and as such, is not appropriate to be used as regulatory guidance. Specifically, the portion of the Harper 2007 report dealing with calculating anoxic depth is entirely novel and has not been scientifically peer reviewed; therefore, it should not be relied upon – especially in light of the fact that many of the lakes within the project are deeper than 15 feet and lakes commonly stratify at 12-15 feet. Therefore, the lakes should instead be redesigned to be shallower - per Section 4.2.4.2 of the Basis of Review dealing with "long term water quality impacts" where it states that "the depth of the waterbodies must be designed to insure proper mixing so that the water quality standard for dissolved oxygen will not be violated in the lower levels of the water body, but the depth should not be so shallow that the bottom sediments are frequently re-suspended by boat activity."

Also, the assessment according to the 2007 Harper methodology uses the agricultural row crop condition as a "pre-development" benchmark, which essentially vests the applicant with the right to pollute as much as the previous land use. This is an inappropriate standard to apply in order to ensure that the applicant is providing sufficient stormwater for the proposed project.

Moreover, the applicant's analysis indicated that they will not achieve the 80% removal of Phosphorus and Nitrogen required by the Florida Administrative code. In fact, the Water Quality Analysis document dated February 4, 2009 provided by the applicant shows a removal rate of only 74% Phosphorus (TP) and 41.9% of Nitrogen (TN) through their wet detention system. A loading reduction rate of 80% must be met for both types of nutrients pursuant to the Florida Administrative Code 62-40.432 where it states that the District shall specify that stormwater management systems "achieve at least 80 percent reduction of the average annual load of pollutants that would cause or contribute to violations of state water quality standards". Nitrogen and Phosphorus are common pollutants of concern, often contributing to low dissolved oxygen impairments. As this Basin (WBID 3259I) already fails to meet state water quality for dissolved oxygen (see Exhibit E), special attention should be paid to ensure additional Nitrogen or Phosphorus pollution does not further exacerbate the situation.

Additionally, as anticipated from a development of this site, "a variety of secondary and cumulative impacts from….introduction of domestic animals, fugitive lighting, fertilizers, oils and greases, stormwater management systems changing hydro-patterns, introduction of exotic landscaping plants, yard waste dumping, mosquito control and other pesticides, etc., will result from development of the site[16]."

Therefore, this project as proposed does not comply with Florida Administrative Code 62-40.432, nor does it attain 401 certification standards and as such, we would recommend that the SFWMD require that additional structural and non-structural BMPs be utilized by the applicant until 80% removal for both TP and TN is achieved by the project's stormwater management system.

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[16] Southwest Florida Regional Planning Council letter, 1st Sufficiency RAI Questions, by Jim Beever.

Additionally, we are concerned that the water management lakes, due to their depth, constitute a threat to adjacent wetlands. We commend the District for asking for additional soil borings, but these boring samples, reviewed in the October 27, 2008 Geotechnical Exploration and Engineering Services Report submitted by the applicant, does not seem to include any samples in the northwest corner of the proposed development where the town center is planned. The District should request additional soil borings to 40 feet in these areas, to protect adjacent surrounding wetlands, in particular, the Shaggy Cypress system.

Insufficient Analysis of Hydroperiod Alteration

As the Town of Big Cypress footprint is located within a Core Foraging Area (CFA) of 8 known nesting colonies of endangered wood storks[17], it is imperative that the applicant show that proposed project will not cause an "adverse impact… caused by increasing or decreasing the depth, duration or frequency of inundation or saturation within a wetland.[18]" The District should request evidence that the proposed outfall into the WRA wetland preserves will not alter the hydroperiod for these areas or the adjacent wetlands, as they are currently being utilized by woodstorks, a wetland-dependent species. Also, the applicant should provide reasonable assurance under the BOR § 4.2.2.4 that "the regulated activity will not change the hydroperiod of a wetland." Additional information regarding hydroperiod change and potential impacts to the woodstork has also been requested by the US Fish and Wildlife Service[19]. Therefore, the SFWMD should not deem this application complete without receiving a substantive analysis from the applicants of the impacts of routing the stormwater into the wetlands within the Water Retention Areas and Camp Keais Strand to demonstrate that the project as proposed will not change the hydroperiods of those wetlands.

Inappropriate Water Use

The Conservancy is also concerned about the applicant's excessive water use. As only 75% of their irrigation water needs will be provided by reclamation, they will still need to draw 592,500 gallons a day for "Phase I" (i.e. the first nine years) of development and up to 1,262,500 gallons during a day during "Phase II[20]." Although the applicant proposes to draw from the Lower Hawthorne, the Conservancy shares the District's concern about extensive use of this aquifer, particularly when considering the cumulative impact of 14 wells drawing from this aquifer as part of the proposed Northeast Collier County Utilities Facility and the increase in chloride levels in public wells drawing from the Lower Hawthorne. The applicant should be required to appreciably reduce their irrigation needs and/or institute additional water conservation techniques to reduce their water supply needs as a condition of permit issuance.

Inconsistent with the Basis of Review and Does Not Meet the Public Interest Test

The applicant continues to infer in their responses to the numerous Requests for Additional Information that the District should only be considered with the value of

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[17] FWS letter dated November 18, 2008.
[18] BOR p. O-1.
[19] FWS letter dated November 18, 2008.
[20] RAI Response Water Supply Impact Assessment provided by applicant.

wetland functions, however per the BOR, the District must review adverse impacts on aquatic or wetland-dependent fish and wildlife. The Town of Big Cypress is clearly subject to the public interest test[21], and the project will adversely affect fish and wildlife, including endangered and threatened species.[22]

The applicant proposes to adversely impact 3,700 acres of critical panther habitat, 3,400 of which is considered primary habitat. Florida panther Primary, Secondary and Dispersal habitat zones are delineated in Kautz, 2006,[23] which is considered the best available science by the United States Fish and Wildlife Service (FWS) regarding panther habitat needs. These habitat zones are considered essential to sustain the Florida panther population at its currently critically-endangered state. "Taken together, the three zones in their current condition apparently have the capacity to support approximately 80-94 Florida panthers[24]"; however, this assumption is based on "no net loss of landscape function or carrying capacity[25]." Impacts to the Primary zone, which is considered the minimum "space to support a population that is barely viable demographically as long as the habitat base remains stable[26]," are of particular concern. The Florida Panther Recovery Plan – 3rd Revision states that "To prevent further loss of population viability, *habitat conservation efforts should focus on maintaining the total available area, quality, and spatial extent of habitat within the Primary Zone*" (emphasis added).[27] This has not been respected with regard to the site selection and design of the proposed project.

While the District is requesting the applicant to fence the entire footprint perimeter, the Conservancy continues to have concerns about the serious and inevitable human-panther interactions that will result from the location of this development and the indirect impacts to the panther that may result in an incidental taking of this imperiled species. This project will result in an estimated 20,000 people residing adjacent to heavily-utilized panther habitat. Increased human-panther interactions will have devastating effects on continued conservation efforts. These interactions could be avoided if the development footprint was moved to an area less utilized by panthers. The applicant owns suitable lands for this development in the immediate vicinity that are outside the primary zone habitat area and have no documented telemetry. The South Florida Water Management District should require the applicant to revise their project footprint accordingly, rather than requiring fencing and a moat, which will simply be a deterrent and would not serve to prevent these avoidable negative panther-human interactions.

The applicant has offered no means to avoid, minimize or mitigate the project's indirect impacts, such as road mortalities. The applicant's documents seem to suggest that the panther crossings provided outside of the scope of the Town of Big Cypress on Oil Well Road are satisfactory for any secondary impacts resulting from the proposed project. The

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[21] BOR § 4.2.3.
[22] BOR § 4.2.3(b).
[23] Kautz, R., et al (2006). How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133.
[24] Kautz, R., et al (2006). How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 131.
[25] Kautz, R., et al (2006). How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 118.
[26] Kautz, R., et al (2006). How much is enough? Landscape-scale conservation for the Florida panther. *Biological Conservation*: Vol. 130, p. 118-133. p. 129.
[27] US Fish and Wildlife Service (2009) *Florida Panther Recovery Plan 3rd Revision*. p. 89.

Town of Big Cypress will effectively pinch the Camp Keais Strand corridor –which is one of only two main north-south movement corridors for the panther. Additionally, all internal wildlife crossings are intentionally designed to exclude large mammals such as the Florida panther and the state-listed threatened Florida black bear. Any loss in corridor function could exacerbate the confinement of panthers in South Florida, leading to an increase in road mortality and intra-specific aggression. The applicant may avoid and minimize their impacts on the Florida panther by altering their site plan to lands north of Oil Well Road. Additionally, the applicant must provide additional assurances against secondary impacts by providing panther crossing(s) at an appropriate location.

Because Section 4.2.3 of the ERP Basis of Review states that in order for the District to determine that a project meets the public interest test, that "the District shall consider and balance, and an applicant must address.." "whether the regulated activity will adversely affect the conservation of fish and wildlife, including endangered and threatened species, or their habitats (40E-4.302(1)(a)2., F.A.C.)" and this project clearly will adversely impact the endangered Florida panther as proposed, this project does not meet the public interest test. Additionally, Section 4.2.2 of the Basis of review states that "*As part of the assessment* of the impacts of regulated activities upon fish and wildlife and their habitats, the District will provide a copy of all notices of application…to the Florida Game and Fresh Water Fish Commission for review and comment (emphasis added)." The Section does not say that FFWCC's assessment and comments are the entire basis on which the SFWMD must rely. In this instance, we recommend that the SFWMD not rely on the FFWCC's opinion as the FFWCC has expressly stated they do not consider modifications to development footprints for the purposes of avoidance of impacts. Additionally, the US Fish and Wildlife Service has expressed substantial concerns with regard to this project's impact on federally listed species – including a "may affect" determination for the Florida panther, which should be part of the SFWMD's assessment as well.

The science and data show that the proposed project site is heavily utilized by the endangered Florida panther as 97 telemetry points have been recorded onsite (see Attachment D) and over 90% of the site is Primary zone (an area deemed essential to sustaining the current population). The SFWMD should therefore decide that the proposed project does not meet the public interest test required for permit issuance. In doing so, the SFWMD should require the applicant to explore practicable modifications, including the alteration of their development footprint to avoid Florida panther Primary zone habitat by shifting the project to their adjacent lands to the north, which would be in accordance with the SFWMD's Basis of Review guidelines.

Conclusion

The Town of Big Cypress, as currently proposed, does not meet the requirements for permit issuance. In addition to addressing the concerns outlined in this letter, the applicant should be required to:

- Pursue a consumptive water use permit and DEP deep injection well permitting prior to the District issuing first Construction/Operation permits
- Finalize required conservation easement(s) and proof of financial assurance prior to the District issuing first C/O permit

- Remove grade impediments at Oil Well Grade Road to restore hydrological connection pursuant to the District

Florida Administrative Code Rule 40E-4.301(1)(e) states that in order to obtain a permit, "an applicant must provide reasonable assurance" that the permitted system "will not adversely impact the value of functions provided to fish and wildlife and listed species by wetlands and other surface waters". The Town of Big Cypress, as proposed, does not meet permit issuance criteria, and will have adverse impacts on the "abundance and diversity of[28]" and "the habitat of fish, wildlife and listed species[29]" namely, the endangered Florida panther.

Pursuant to the BOR § 4.3, "in certain cases, mitigation cannot offset impacts sufficiently to yield a permittable project. Such cases often include activities which… adversely impact habitat for listed species." Based on the evidence provided in this letter, we ask the District to deny the permit request for the Town of Big Cypress as proposed and to host a public interest meeting to accurately assess concern over this proposed development.

If you have any questions regarding our letter, please feel free to call Amber Crooks, Natural Resource Policy Specialist at (239) 262-0304 ext. 286 or myself at ext. 250. Thank you for your consideration of this matter.

Sincerely,

Jennifer Hecker

Jennifer Hecker
Natural Resource Policy Manager

cc: Victoria Foster, USFWS
Paul Souza, USFWS
Joe Walsh, FFWCC
Darryl Land, FFWCC
Carole Wehle, SFWMD
Laura Layman, SFWMD
Jessica White, SFWMD
Susan Mason, Collier County

[28] At BOR § 4.2.2.
[29] At BOR § 4.2.2.

Exhibit A

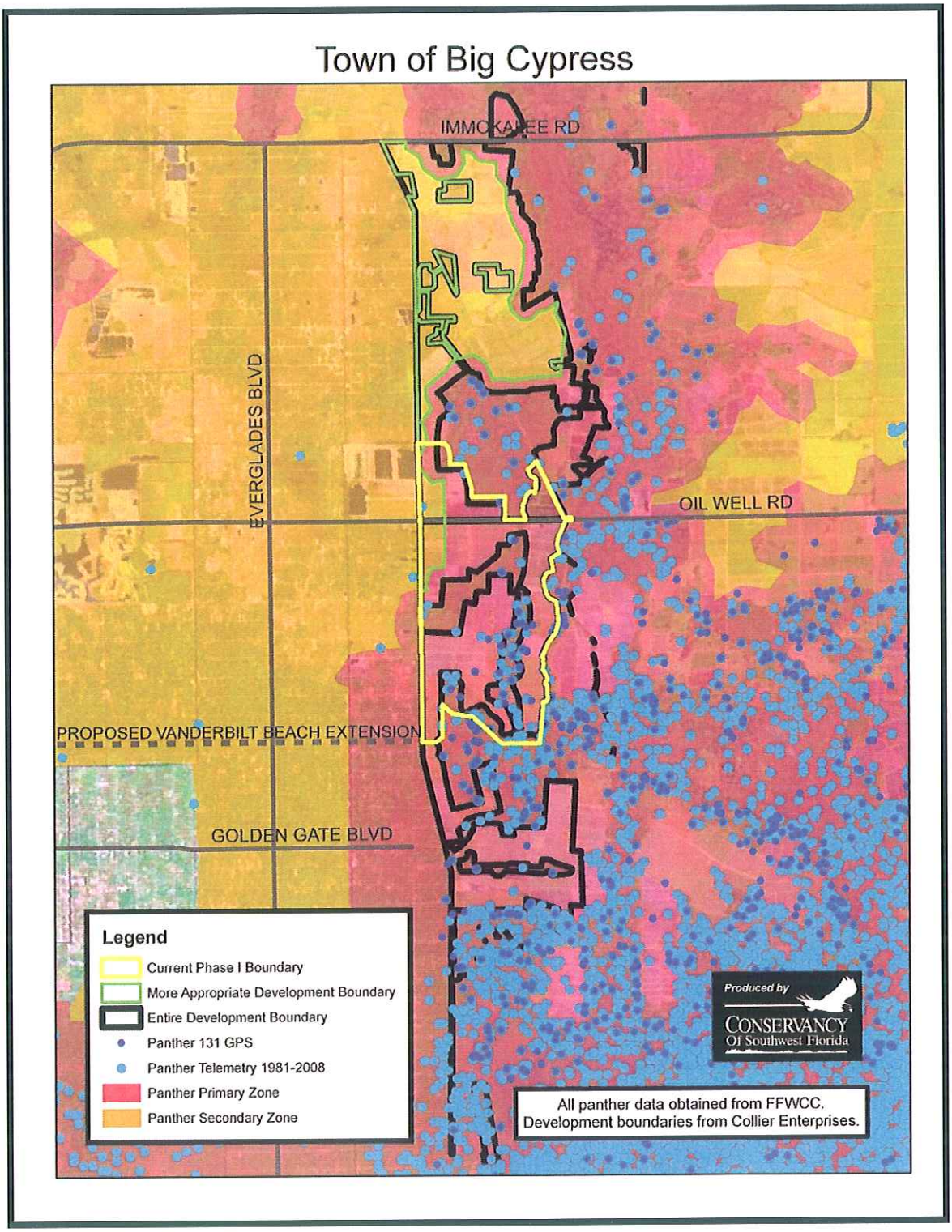

Town of Big Cypress
IMMOKALEE RD
EVERGLADES BLVD
OIL WELL RD
PROPOSED VANDERBILT BEACH EXTENSION
GOLDEN GATE BLVD
Legend
Current Phase I Boundary
More Appropriate Development Boundary
Entire Development Boundary
Panther 131 GPS
Panther Telemetry 1981-2008
Panther Primary Zone
Panther Secondary Zone
Produced by
CONSERVANCY
Of Southwest Florida
All panther data obtained from FFWCC.
Development boundaries from Collier Enterprises.

Exhibit B

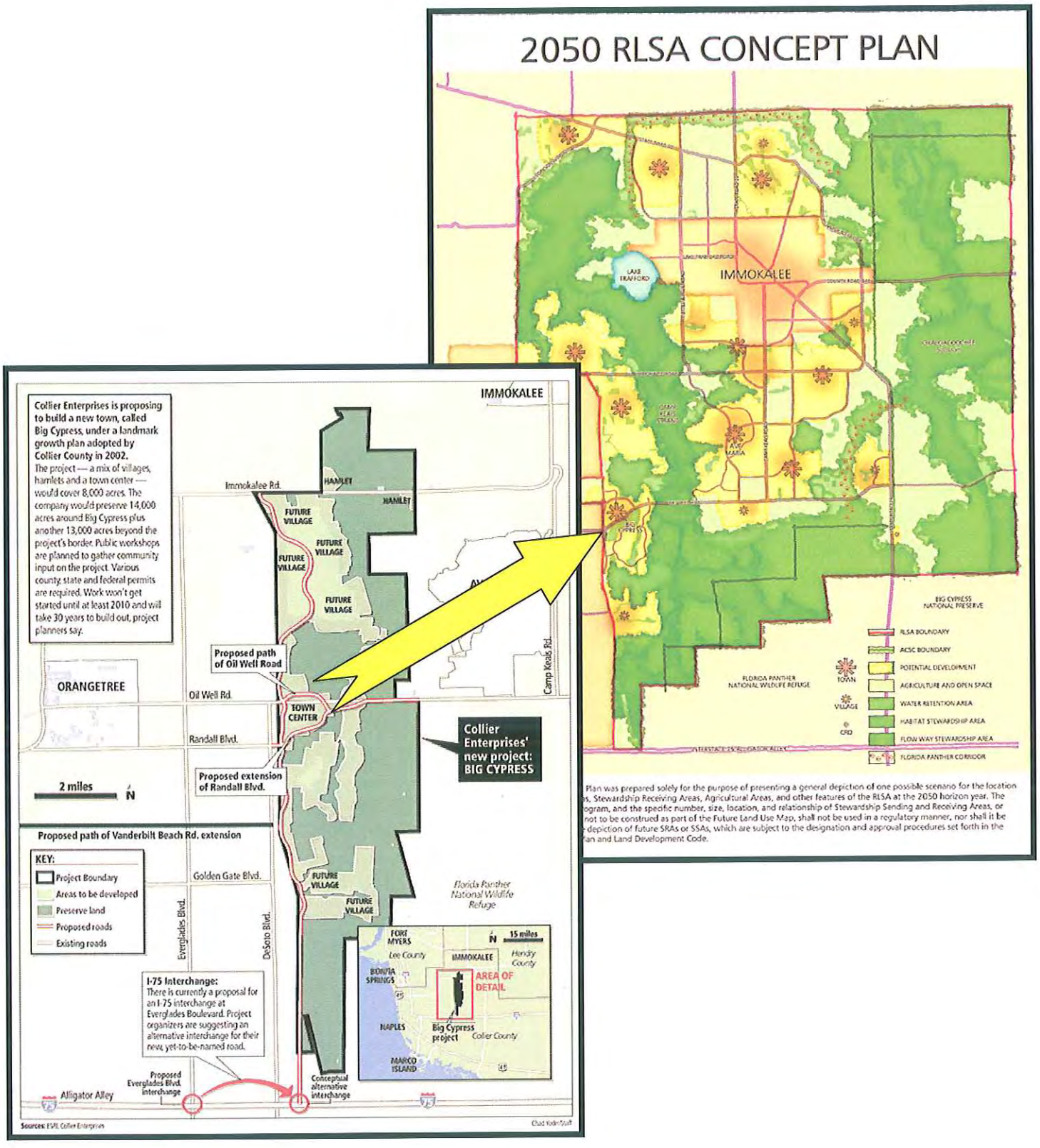
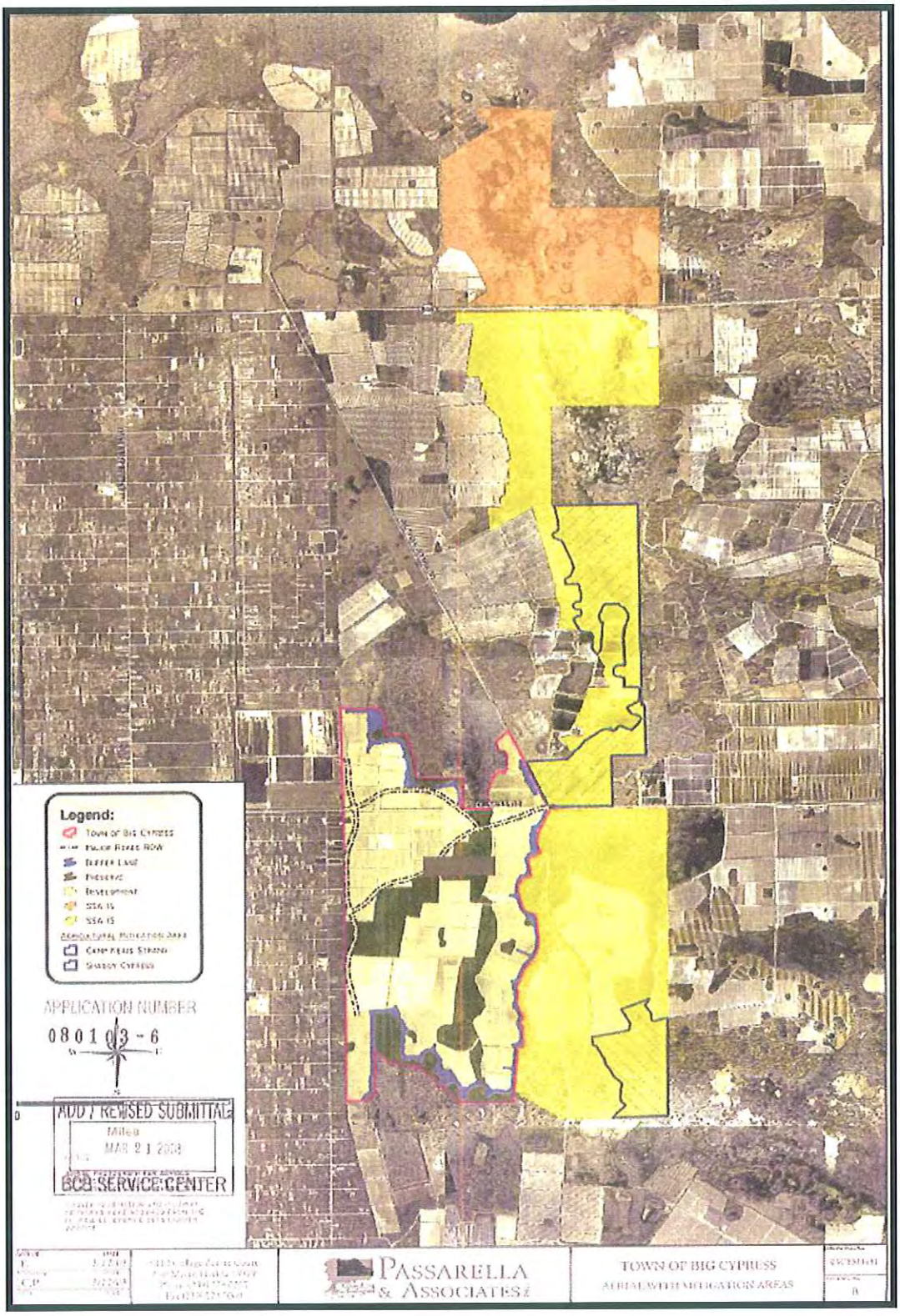
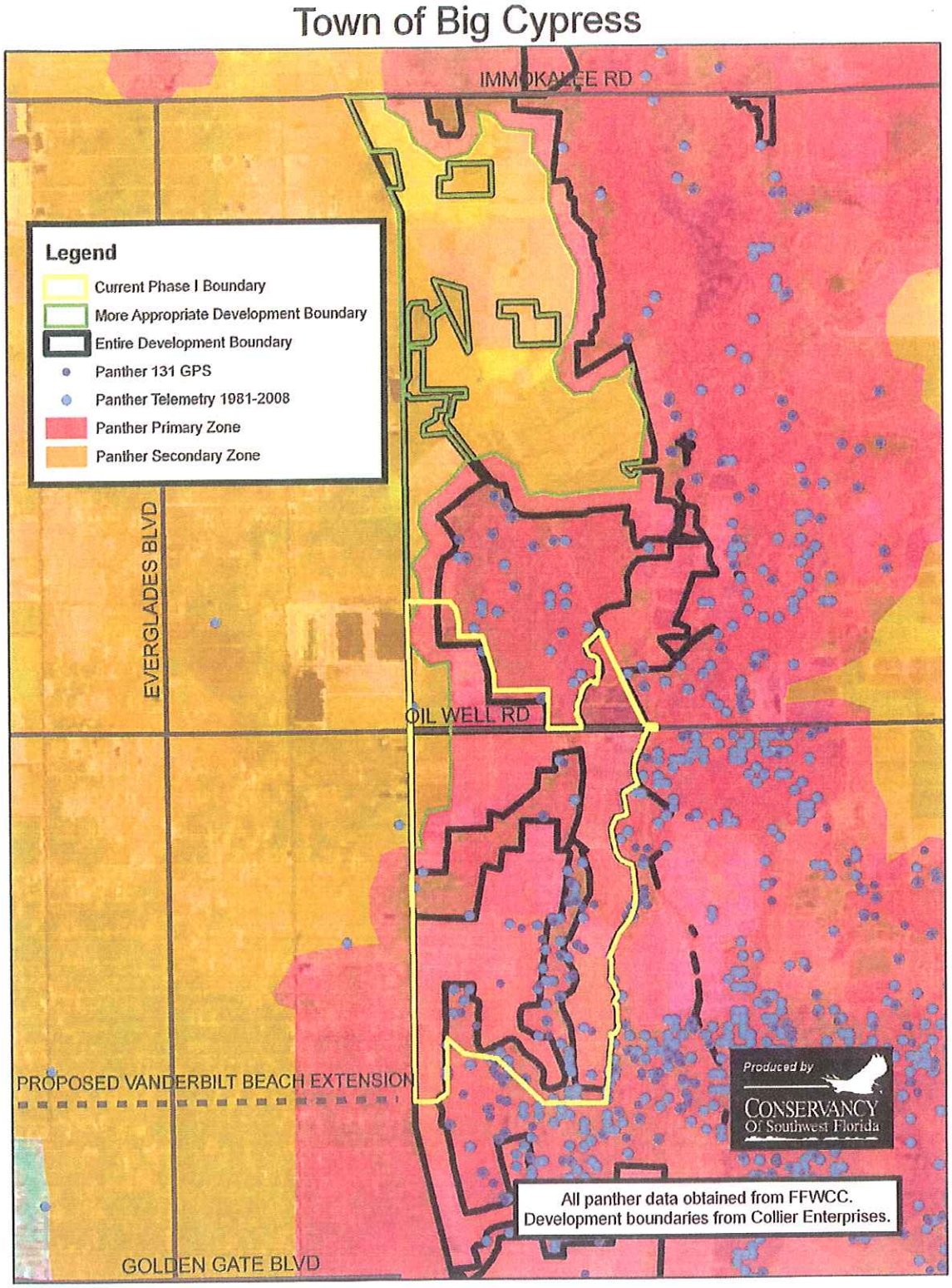

2050 RLSA CONCEPT PLAN
IMMOKALEE
LAKE TRAFFORD
BIG CYPRESS NATIONAL PRESERVE
FLORIDA PANTHER NATIONAL WILDLIFE REFUGE
RLSA BOUNDARY
ACSC BOUNDARY
POTENTIAL DEVELOPMENT
AGRICULTURE AND OPEN SPACE
WATER RETENTION AREA
HABITAT STEWARDSHIP AREA
FLOW WAY STEWARDSHIP AREA
FLORIDA PANTHER CORRIDOR
TOWN
VILLAGE
CRD
Plan was prepared solely for the purpose of presenting a general depiction of one possible scenario for the location
s, Stewardship Receiving Areas, Agricultural Areas, and other features of the RLSA at the 2050 horizon year. The
ogram, and the specific number, size, location, and relationship of Stewardship Sending and Receiving Areas, or
not to be construed as part of the Future Land Use Map, shall not be used in a regulatory manner, nor shall it be
depiction of future SRAs or SSAs, which are subject to the designation and approval procedures set forth in the
an and Land Development Code.
Collier Enterprises is proposing to build a new town, called Big Cypress, under a landmark growth plan adopted by Collier County in 2002.
The project — a mix of villages, hamlets and a town center — would cover 8,000 acres. The company would preserve 14,000 acres around Big Cypress plus another 13,000 acres beyond the project's border. Public workshops are planned to gather community input on the project. Various county, state and federal permits are required. Work won't get started until at least 2010 and will take 30 years to build out, project planners say.
IMMOKALEE
Immokalee Rd.
HAMLET
HAMLET
FUTURE VILLAGE
FUTURE VILLAGE
FUTURE VILLAGE
FUTURE VILLAGE
Proposed path of Oil Well Road
ORANGETREE
Oil Well Rd.
TOWN CENTER
Camp Keais Rd.
Randall Blvd.
Collier Enterprises' new project: BIG CYPRESS
Proposed extension of Randall Blvd.
2 miles
N
Proposed path of Vanderbilt Beach Rd. extension
KEY:
Project Boundary
Areas to be developed
Preserve land
Proposed roads
Existing roads
Golden Gate Blvd.
Everglades Blvd.
DeSoto Blvd.
FUTURE VILLAGE
FUTURE VILLAGE
Florida Panther National Wildlife Refuge
I-75 Interchange:
There is currently a proposal for an I-75 interchange at Everglades Boulevard. Project organizers are suggesting an alternative interchange for their new, yet-to-be-named road.
Proposed Everglades Blvd. interchange
Conceptual alternative interchange
Alligator Alley
FORT MYERS
Lee County
IMMOKALEE
Hendry County
BONITA SPRINGS
AREA OF DETAIL
NAPLES
Big Cypress project
Collier County
MARCO ISLAND
N
15 miles
Sources: FSPL Collier Enterprises
Chad Yoder/Staff

Exhibit C

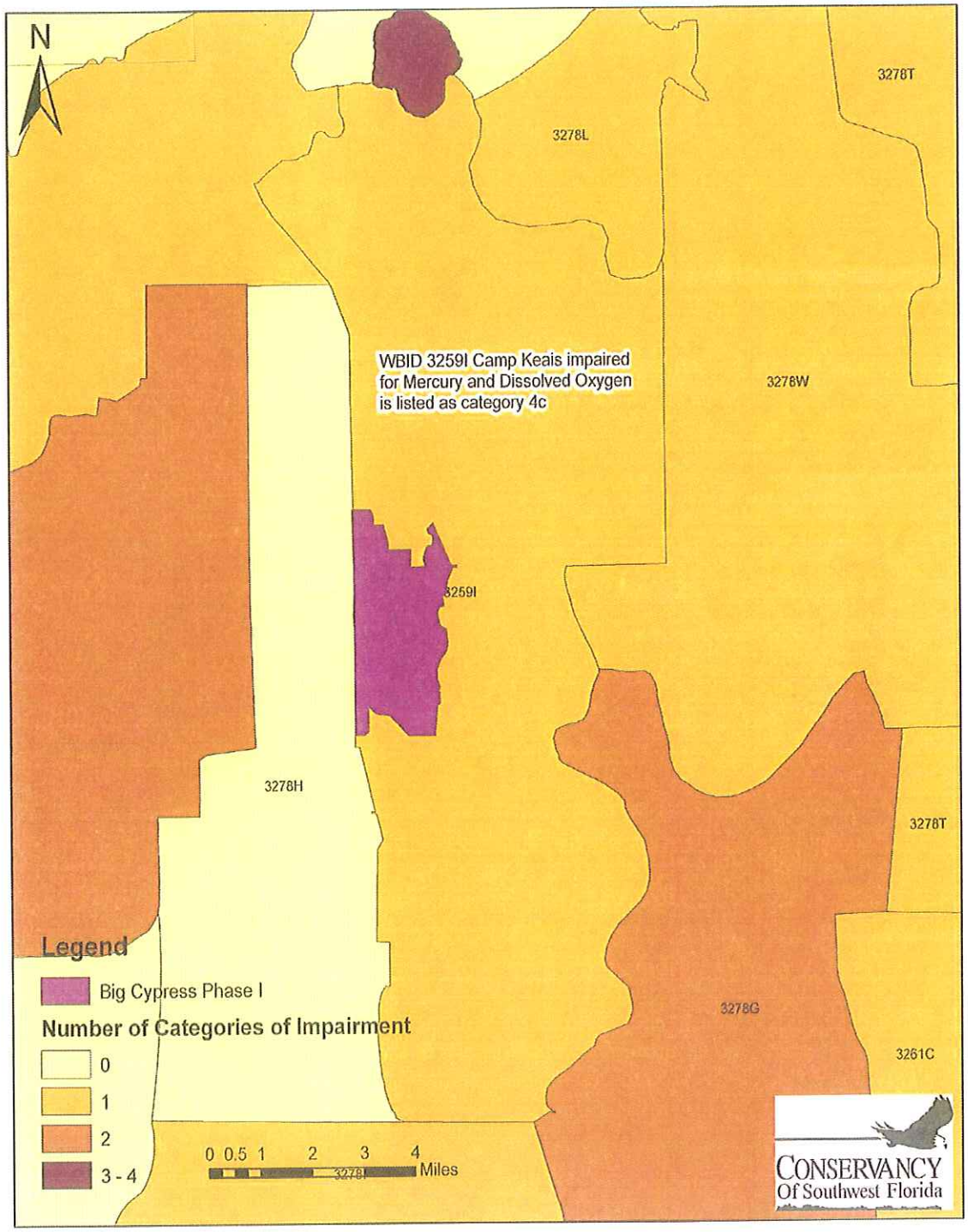

Legend:
APPLICATION NUMBER
080103-6
ADD'L REVISED SUBMITTAL
MAR 21 2008
BCB SERVICE CENTER
PASSARELLA & ASSOCIATES
TOWN OF BIG CYPRESS

Attachment D:
Updated Telemetry Map of the Town of Big Cypress Site
(97 Telemetry Recorded On-site To Date)



Attachment E:

Town of Big Cypress - Watershed Impairments



From:	Raborn, Nathan
To:	higgins.jamie@epa.gov
Cc:	hughes.eric@epa.gov
Bcc:	constance_cassler@fws.gov
Subject:	Eastern Collier Multiple Species Habitat Conservation Plan
Date:	Tuesday, August 02, 2016 11:34:38 AM
Attachments:	20160728_Letter_Service to EPA_Comments Request for dEIS.PDF

Please see attached. Have a great day.

--

Nathan W. Raborn
Administrative Support Assistant
US Fish & Wildlife Service
1339 20th Street
Vero Beach, FL 32960
Phone: 772-562-3909 ext. 237
Fax: 772-778-2568

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

July 28, 2016

Ms. Jamie Higgins
Environmental Protection Agency, Region 4
NEPA Program Office
Via Email: Higgins.Jamie@epa.gov

Dear Ms. Higgins:

On March 30, 2016, the U.S. Fish and Wildlife Service (Service) provided notice to the U.S. Environmental Protection Agency (EPA) Region 4 of the Service's intention to prepare a draft Environmental Impact Statement (dEIS) related to an anticipated permit application from nine Collier County, Florida landowners for the incidental take of listed species. The Department of the Army, through its bureau the U.S. Army Corps of Engineers, will be a cooperating agency in the development of the dEIS.

The dEIS will be prepared in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4327; 40 CFR 1500-1508), as amended (NEPA). The permit application would include an "Eastern Collier Multiple Species Habitat Conservation Plan" (ECMSHCP) prepared in accordance with the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The ECMSHCP covers approximately 152,124 acres of land in northeastern Collier County and borders Lee and Hendry counties. Additional information regarding the ECMSHCP and associated NEPA study is available at the project website at www.easterncollierHCPEIS.com.

The Service conducted an open-house public scoping meeting on April 12, 2016 in Naples, Florida and an online inter-agency scoping meeting on April 19, 2016. During the scoping period the Service received 2,465 responses from the public and agency/governmental officials; however, we note that no response has been received from the EPA. Although the scoping period for the project ended on April 25, 2016, the Service again invites the EPA to comment on the proposed federal action and associated ECMSHCP. Any comments submitted by the EPA will be considered during development of the dEIS. All correspondence or questions may be directed to:

Kenneth McDonald, Project Manager
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559
Office: 772.469.4284
Fax: 772.562.4288
Kenneth_mcdonald@fws.gov

The Service appreciates the EPA's participation in this NEPA study and looks forward to any comments or questions you may have.

Sincerely yours,

for Constance L Cassler

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services Office

cc: electronic only
EPA, (Eric Hughes)

From:	Les Alderman
To:	larry_williams@fws.gov
Cc:	"Foster, Victoria"; Constance_cassler@fws.gov
Subject:	Ken McDonald and his Modeling Effort
Date:	Saturday, August 20, 2016 11:32:49 AM
Attachments:	image001.png

Mr. Williams:

Good Morning, I do hope that this finds you and all of yours well.

I wanted to drop you a line, not just to say hello but to commend to you a young man laboring away in the "trenches" as we used to say. This past Tuesday, I had the opportunity to meet with several of you staff, including Dr. Cassler, Paula Halupa and her associate Marilyn and a young man named Ken McDonald.

I am happy to say that all of the meetings were very productive and useful. As a result, we are moving forward with the second and third phase of our latest habitat conservation bank and we are moving forward with our Bonneted Bat Surveys.

I must tell you how impressed I was with Mr. McDonald and the models that he is developing for use with the EIS that you are working on in response to the Collier HCP. I found his work fascinating. I know that this approached has been used for other things at other times, but this is the first that I've seen applied to Endangered Species protection. I hope that at some point we will be able to see the model and have the opportunity to take it for a "test ride". Certainly the future for this type of application is wide open.

Congratulations to you, Mr. McDonald and your entire team.

Respectfully,

Les
Leslie D. Alderman, Jr.
Founder and Managing Member
Florida Panther Conservation, LLC
6118 Deer Run
Fort Myers, Florida 33908
Phone: 239 633-8375
lesa@pantherconservation.com

FLORIDA PANTHER
CONSERVATION

FLORIDA PANTHER CONSERVATION