U.S. Fish and Wildlife Service
Participation in Peer Review of the Status Assessment (SSA) Report
for the Humpback Chub (Gila cypha)

BACKGROUND INFORMATION
AND
CONFLICT OF INTEREST DISCLOSURE

NAME: Paul Badame TELEPHONE: (385)235-1559

ADDRESS: 1594 W. North Temple, Suite 2110

Salt Lake City, UT 84114

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CURRENT EMPLOYER: Utah Division of Wildlife Resources

This form has two (2) parts:

Part I – Background Information, and;
Part II – Conflict of Interest Disclosure.

Please complete both parts, **sign** and **date** the form on the last page, and **return the form to** Joy Gober, U.S. Fish and Wildlife Service, 1363 County Road 219, Richland Springs, Texas 76871, or by email to joy_gober@fws.gov. **Please retain a copy for your records**.

PART I
BACKGROUND INFORMATION

INSTRUCTIONS

Please provide the information requested below regarding **relevant** organizational affiliations, government service, public statements and positions, research support, and additional information (if any). Information is "relevant" if it is related to -- and might reasonably be of interest to others concerning -- your knowledge, experience, and personal perspectives regarding the subject matter for which this form is being completed. If some or all of the requested information is contained in your curriculum

vitae (CV), you may prefer to simply attach your CV to this form, supplemented by additional responses or comments below as necessary.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant business relationships (as an employee, owner, officer, director, consultant, etc.) and your relevant remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups, etc.).

See my attached CV

II. GOVERNMENT SERVICE. Report your relevant service (full-time or part-time) with federal, state, or local government in the United States (including elected or appointed positions, employment, advisory board memberships, military service, etc.).

See my attached CV

III. RESEARCH SUPPORT. Report relevant information regarding both public and private sources of research support (other than your present employer), including sources of funding, equipment, facilities, etc.

No relevant research support outside of my current employer

IV. PUBLIC STATEMENTS AND POSITIONS. List your relevant articles, testimony, speeches, etc., by date, title, and publication (if any) in which they appeared, or provide relevant representative examples if numerous. Provide a brief description of relevant positions of any organizations or groups with which you are closely identified or associated.

None Applicable

V. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the topics addressed in the Species Status Assessment Report, and therefore might constitute an actual or potential source of bias, please describe them briefly.

Not Applicable

PART II
CONFLICT OF INTEREST DISCLOSURE

INSTRUCTIONS

It is essential that a peer reviewer used by the U.S. Fish and Wildlife Service as part of its peer review of Species Status Assessments under the ESA not be compromised by conflict of interest. For this purpose, **the term "conflict of interest" means any financial or other interest which conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization.**[1] Except for those situations in which the Service determines that a conflict of interest is unavoidable and promptly and publicly discloses the conflict of interest, no individual can participate in a peer review process used by the Service in a Species Status Assessment if the individual has a conflict of interest that is relevant to the functions to be performed.

The term "conflict of interest" means something more than individual bias. There must be an *interest* that could be directly affected by your participation as a peer reviewer.

Conflict of interest requirements are *objective* and *prophylactic*. They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the Service, and the public interest. The individual and the Service should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the information produced through the peer review simply because of the existence of conflicting interests.

The term "conflict of interest" applies only to *current interests*. It does not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future but do not currently exist, because such future interests are inherently speculative and uncertain. For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is <u>not</u> a current interest.

The term "conflict of interest" applies not only to the personal interests of the individual but also to the *interests of others* with whom the individual has substantial common financial or other interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration

[1] This definition and the other information in these instructions are drawn from the National Academy of Sciences Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports (May 12, 2003).

must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial or other interests. Consideration must also be given to the interests of those for whom one is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Such interests could include an individual's stock holdings in excess of $10,000 in a potentially affected company or being an officer, director, or employee of the company. Serving as a consultant to the company could constitute such an interest if the consulting relationship with the company could be directly affected or is directly related to the subject matter of the regulatory process.

An individual's other possible interests might include, for example, relevant patents and other forms of intellectual property, serving as an expert witness in litigation directly related to the subject matter of the regulatory process, or receiving research funding from a party that would be directly affected by the regulatory process if the research funding could be directly affected or is directly related to the subject matter of the regulatory process and the right to independently conduct and publish the results of this research is limited by the sponsor. Consideration would also need to be given to the interests of others with whom the individual has substantial common financial interests -- particularly spouses, employers, clients, and business or research partners.

The following questions are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by your peer review.

1. EMPLOYMENT. (a) If the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(i) If you are employed or self-employed, could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected?

(ii) To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) clients and/or business partners be directly affected?

(iii) If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected?

(iv) If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships?

(v) Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction?

(b) If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal conflict of interest restrictions that may be applicable to your service in connection with this peer review?

(c) If you are a U.S. Government employee, are you currently employed by the Service?

If the answer to all of the above questions under EMPLOYMENT is either "no" or "not applicable," check here __X__ (NO).

If the answer to any of the above questions under EMPLOYMENT is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

2. INVESTMENT INTERESTS. Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than $10,000), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(a) Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments?

(b) Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments?

If the answer to all of the above questions under INVESTMENT INTERESTS is either "no" or "not applicable," check here _X__ (NO).

If the answer to any of the above questions under INVESTMENT INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

3. PROPERTY INTERESTS. Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(a) Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected?

(b) To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, etc.) own directly or indirectly any such property interests that could be directly affected?

If the answer to all of the above questions under PROPERTY INTERESTS is either "no" or "not applicable," check here _X__ (NO).

If the answer to any of the above questions under PROPERTY INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

4. RESEARCH FUNDING AND OTHER INTERESTS. (a) Taking into account your research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

> (i) Could the research funding and support for you or your close research colleagues and collaborators be directly affected, or
>
> (ii) If you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research?

(b) Is the central purpose of the Species Status Assessment Report for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer?

(c) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the Species Status Assessment Report?

(d) To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information?

(e) Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests?

If the answer to all of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is either "no" or "not applicable," check here _X__ (NO).

If the answer to any of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances below.

EXPLANATION OF "YES" RESPONSES:

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

Paul Badame Digitally signed by Paul Badame DN: cn=Paul Badame, o=Utah Divsion of Wildlife Resources, ou, email=pbadame@utah.gov, c=US Date: 2017.07.21 14:55:07 -06'00'

YOUR SIGNATURE

July 21, 2017

DATE

Received by: Joy Gober

Joy Gober
U.S. Fish and Wildlife Service
Mountain Prairie Regional Office
Ecological Services

Aug. 22, 2017

Date

Peer Review by Paul Badame
Received 8/23/2017

Specific questions the reviewers will be asked include the following:

1. **Is our description and analysis of the biology, habitat, population trends, and historic and current distribution of the species accurate?**
   - Overall – These descriptions and analyses were thorough and accurate.

   - Biology – On page *vi* of the executive summary, third bullet; the final portion of that sentence is not true, nor is it supported within the body of the document. The statement *"the species does not migrate or move long distances"* appears to be out of place here. Humpback do make short migrations (GC to LCR etc.) and in upper basin populations individuals have been found to move over 100 miles. This was discussed throughout the report and supported by the genetic diversity found in both the upper and lower basin. I recommend omitting the quoted portion of the sentence.

   - Habitat – Thorough and appropriate.

   - Population trends – This is a key part of the assessment and I believe that the use multiple metrics was wise. The examination of each population's *lambda* in both one and two phases demonstrated that capturing the cyclical population trajectories of a long-lived fish requires as broad of a timeframe as possible. The inclusion of historical monitoring data (ISMP), especially in the upper basin provided additional support for the overall shift in population trajectories. The use of all available population data and multiple angles of analysis provide an accurate depiction of population trends over the last 20-30 years

   - Historic/Current distributions – The map on page 7 is not legible and the overlap of colors does not work. Otherwise, the description of both are accurate.

2. **Does the Species Status Assessment Report provide accurate and adequate review and analysis of the current and projected future condition of the species?**

   - Current conditions – The overall assessment is an excellent review and analysis of the current condition of the species. Compared to other species status reviews, there is a wealth of information for this species and it is thoroughly examined relative to past and present conditions.

   - Projected Future Conditions – This is where the report falls short. The primary driver for the status of this species is hydrology and there are a lot of studies and models that examine all of the drivers of hydrology in both the upper and lower Colorado Basins. As was done with Page Springsnail and

Boreal Toad this assessment should examine two additional hydrologic scenarios and extend its forecast beyond 16 years. While there is a significant amount of uncertainty about the exact trajectory of each population we have seen the extrication of one population of Humpback and the correlated conditions that likely precipitated the loss; what is the probability that future hydrologic conditions may have a similar population level effect for each remaining population?

It is understood that there is an increasing level of uncertainty in forecasting further in time; but it seems that forecasting to at least 50 years under three scenarios is needed to make determinations about the current status and the current effectiveness of management activities to mitigate threats.

I think the current content of chapter 5.3 is an accurate assessment of population viability under the current hydrologic/climate trajectory, but the timeframe should be extended beyond the period of “likely certain”. Sixteen years is a biologically meaningful timeframe, but it is not meaningful for forecasting management needs. Then describe expected population viability under two additional (worse) hydrologic/climate scenarios. The information is all presented in this assessment, it simply needs to be extended in time and scope.

3. **Are our assumptions and determinations regarding suitable habitat logical and adequate?**

   - Yes

4. **Are there any significant oversights, omissions, or inconsistencies in our Species Status Assessment Report?**

   - Examine population/species viability under three hydrologic scenarios
   - Extend the timeframe of examination beyond a period of “likely certain”

5. **Are the conclusions we reach logical and supported by the evidence we provide?**

   - Yes, the conclusions are logical and supported; but the final decision to only apply the forecast to current conditions and a time period of 16 years is too conservative.

6. **Did we include all the necessary and pertinent literature to support our assumptions/arguments/conclusions?**

   - Yes

U.S. Fish and Wildlife Service
Participation in Peer Review of the Status Assessment (SSA) Report
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BACKGROUND INFORMATION
AND
CONFLICT OF INTEREST DISCLOSURE

NAME: __Brian Healy_____ TELEPHONE: _928-638-7453

ADDRESS: __1824 S. Thompson Street, Flagstaff, AZ 86001_____

_____

EMAIL ADDRESS:
___Brian_Healy@nps.gov_____

CURRENT EMPLOYER: ____National Park Service_____

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Part I – Background Information, and;
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vitae (CV), you may prefer to simply attach your CV to this form, supplemented by additional responses or comments below as necessary.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant business relationships (as an employee, owner, officer, director, consultant, etc.) and your relevant remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups, etc.).

I serve as the fisheries program manager at Grand Canyon National Park (GCNP), employed by the National Park Service (NPS). I manage a program that focuses on the conservation of humpback chub and other native fish in GCNP. The program, including 2 and half FTE employees that I supervise, is funded by the Bureau of Reclamation, although my own salary is paid for by the NPS. The funding provided by the BOR is to implement conservation measures related to Glen Canyon Dam biological opinions.

I'm a member of the American Fisheries Society and the Arizona/New Mexico Chapter of AFS.

II. GOVERNMENT SERVICE. Report your relevant service (full-time or part-time) with federal, state, or local government in the United States (including elected or appointed positions, employment, advisory board memberships, military service, etc.).

I've been employed as a federal fisheries biologist since August of 2000. I worked for the USDA Forest Service- Chippewa National Forest in Minnesota until 2003, then for the USDA Forest Service- White River National Forest until June of 2009, when I began working in my current position as the fisheries program manager for GCNP.

III. RESEARCH SUPPORT. Report relevant information regarding both public and private sources of research support (other than your present employer), including sources of funding, equipment, facilities, etc.

I did not receive any funding for any research or habitat that was not part of my official duties as the fisheries program manager on the east zone of the White River NF, but I collaborated with several nonprofit organizations and the State of Colorado to implement fish habitat conservation projects. The Eagle River Watershed Council provided funding and volunteers to assist the USFS in monitoring the condition of a stream impacted by highway traction sand and develop a TMDL for the creek. The Town of Vail, several water users, as well as the State of Colorado also contributed to this effort (in-kind services).

As mentioned above, the Bureau of Reclamation (BOR) has provided funding to the program I manage to support nonnative fish control and humpback chub translocations in GCNP. The funding supports my staff, as well as equipment, supplies, food, travel, and other items necessary to implement the projects.

IV. PUBLIC STATEMENTS AND POSITIONS. List your relevant articles, testimony, speeches, etc., by date, title, and publication (if any) in which they appeared, or provide relevant representative examples if numerous. Provide a brief description of relevant positions of any organizations or groups with which you are closely identified or associated.

I regularly provide updates on our projects, when requested, to the Glen Canyon Dam Adaptive Management Technical Working Group, which meets 4-5 times per year. The presentations are not "positions" but simply updates on our projects as well as results of data analysis.

The NPS position is described in NPS Management Policies (NPS 2006), which is based in applicable federal law (1916 Organic Act, ESA, NPS General Authorities Act of 1970, etc.). In summary, the NPS is mandated to conserve native fish communities, and preserve resources, unimpaired, within national parks.

Recent peer-reviewed publications:

Spurgeon, J. J., C. P. Paukert, **B. D. Healy**, C. A. Kelley, D. P. Whiting. 2014. Can translocated native fishes retain their trophic niche when confronted with a resident invasive? Ecology of Freshwater Fish 2014: 1-11. Doi: 10.1111/eff.12160

Whiting, D. P., C. P. Paukert, **B. D. Healy**, and J. J. Spurgeon. 2014. Macroinvertebrate prey availability and food web dynamics of nonnative trout in a Colorado River tributary, Grand Canyon. Freshwater Science, Published online May 7, 2014 (in press).

Pine, W. E., III, **B. Healy**, E. Omana Smith, M. Trammell, D. Speas, R. Valdez, M. Yard, C. Walters, R. Ahrens, R. Van Haverbeke, D. Stone, W. Wilson. 2013. An individual-based model for population viability analysis of humpback chub in Grand Canyon. North American Journal of Fisheries Management 33:626-641.

V. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the topics addressed in the Species Status Assessment Report, and therefore might constitute an actual or potential source of bias, please describe them briefly.

Not applicable

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The term "conflict of interest" applies not only to the personal interests of the individual but also to the *interests of others* with whom the individual has substantial common financial or other interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration

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must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial or other interests. Consideration must also be given to the interests of those for whom one is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Such interests could include an individual's stock holdings in excess of $10,000 in a potentially affected company or being an officer, director, or employee of the company. Serving as a consultant to the company could constitute such an interest if the consulting relationship with the company could be directly affected or is directly related to the subject matter of the regulatory process.

An individual's other possible interests might include, for example, relevant patents and other forms of intellectual property, serving as an expert witness in litigation directly related to the subject matter of the regulatory process, or receiving research funding from a party that would be directly affected by the regulatory process if the research funding could be directly affected or is directly related to the subject matter of the regulatory process and the right to independently conduct and publish the results of this research is limited by the sponsor. Consideration would also need to be given to the interests of others with whom the individual has substantial common financial interests -- particularly spouses, employers, clients, and business or research partners.

The following questions are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by your peer review.

1. EMPLOYMENT. (a) If the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(i) If you are employed or self-employed, could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected?
No

(ii) To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) clients and/or business partners be directly affected?
No

(iii) If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected? No

(iv) If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships? N/A

(v) Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction? No

(b) If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal conflict of interest restrictions that may be applicable to your service in connection with this peer review? No

(c) If you are a U.S. Government employee, are you currently employed by the Service? National Park Service is my employer

If the answer to all of the above questions under EMPLOYMENT is either "no" or "not applicable," check here ___No__ (NO).

If the answer to any of the above questions under EMPLOYMENT is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

2. INVESTMENT INTERESTS. Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than $10,000), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(a) Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? No

(b) Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments? No

If the answer to all of the above questions under INVESTMENT INTERESTS is either "no" or "not applicable," check here __NO___ (NO).

If the answer to any of the above questions under INVESTMENT INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

3. PROPERTY INTERESTS. Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(a) Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected?
No
(b) To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, etc.) own directly or indirectly any such property interests that could be directly affected?
NO
If the answer to all of the above questions under PROPERTY INTERESTS is either "no" or "not applicable," check here __NO___ (NO).

If the answer to any of the above questions under PROPERTY INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

4. RESEARCH FUNDING AND OTHER INTERESTS. (a) Taking into account your research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the humpback chub --

(i) Could the research funding and support for you or your close research colleagues and collaborators be directly affected, or
Potentially

(ii) If you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research?

(b) Is the central purpose of the Species Status Assessment Report for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer? No

(c) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the Species Status Assessment Report? No

(d) To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information? No

(e) Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests?
NO

If the answer to all of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is either "no" or "not applicable," check here _____ (NO).

If the answer to any of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is "yes," check here __Yes__ (YES), and briefly describe the circumstances below.

EXPLANATION OF "YES" RESPONSES:

The funding to support GCNP staff (excluding my own salary) and projects to conserve humpback chub are related to the listing status of the humpback chub. The funding provided is for the purpose of implementing conservation measures for humpback chub.

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

YOUR SIGNATURE

7/25/17
DATE

Received by: Joy Gober
Joy Gober
U.S. Fish and Wildlife Service
Mountain Prairie Regional Office
Ecological Services

7/25/2017
Date

Comments on the Species Status Assessment for the Humpback Chub, Draft July 15, 2017

Brian Healy, Grand Canyon National Park Fisheries Program Manager

August 9, 2017

Included below are my page-specific comments on the status assessment. I commend the authors on their efforts to compile an exhaustive amount of information for the species. I hope my comments below are helpful in finalizing the SSA. Please let me know if there are additional questions or clarifications needed.

Section 2.0 – Species Overview:

The range and distribution discussion is somewhat confusing. The discussion begins by stating that the estimated historical range included 2,180 km of river, but also that the range is uncertain. By the third paragraph, the historical range has been reduced to 764 km of river, and I'm not sure that the rationale for this reduction is well-supported in the preceding paragraphs. It appears the authors are attempting to justify a smaller section of historically occupied habitat by focusing on population centers and then removing intervening river reaches. I would suggest treating the currently occupied habitat in the same way. For example, the footnote indicates the "Grand Canyon" population includes river miles from the Paria River to Lake Mead, and tributaries, but I don't believe a humpback chub has been recently captured upstream of River Mile 30 recently (i.e., 30 miles/48 km below the Paria). Also, based on information stated later in the document, it appears as if the Yampa River population may be extirpated or nearly extirpated, but the habitat (52.1 km, citing Tyus 1998 and Finney 2006) is considered currently occupied. This section may simply need additional explanation and current, supporting citations to clarify these issues.

P. 17 – NPS-GCNP has additional data related to reproduction and recruitment of humpback chub at Havasu Creek, however it is not yet published. The latest analysis, presented at the GCD Adaptive Management in January, 2017 indicates continued reproduction and recruitment at Havasu Creek.

P. 20-21 – I suggest that the discussion of "Habitat with few nonnative predators and competitors" under the "Age-0" and "Juveniles" heading should include some mention of trout predation upon humpback chub included in Yard et al. 2011, and others in the literature since trout pose the most significant threat under current temperature regimes in Grand Canyon.

P. 22 – Heading: "Wide range of flow and flow change." Additional discussion of flood impacts to the translocated population of humpback chub in Shinumo Creek, as well as a description of low flows (combined with smallmouth bass) that may have caused the extirpation of the Yampa population could be added here. In addition, the (Finch 2012) study may not be the best study to demonstrate the ability of humpback chub to withstand a wide-range of flows and flow change, since the flow regime experienced during the study was tightly controlled by Glen Canyon Dam. Historically, flows might reach 120,000 cfs multiple times in a decade, but flows won't reach that level post-dam.

P. 23 – In reference to the Yackulic et al. (2014) study, it might be helpful to suggest that the coldwater reduces growth rates, which results in exposure to coldwater predators for an extended period compared to fish in warmer waters, resulting in decreased survival.

Under the heading "Offshore habitats with large eddies and deep pools" I suggest changing the last sentence to indicate catch rates are higher in deep pools than in other habitats in Shinumo and Havasu creeks rather than stating chub "prefer" deep pools, as no habitat preference study has been conducted there.

P. 24 – The first paragraph at the top of the page discusses the potential positive effects of colder water on humpback chub in Grand Canyon, which may be overstated. While parasites are less tolerant of cold and may be less prevalent in humpback chub in cold water, body condition varies over time, and has potentially declined in the mainstem in Grand Canyon in recent years (food limitation?). It is questionable that humpback chub are "adaptable" to a temperature regime of 10-18°C, when the species can't grow at temperatures below 12, and the likelihood of an individual reaching adulthood at that temperature regime is about 40% lower than in the warmer Little Colorado River (Yackulic et al. 2014).

P. 31- Consider adding a mention of smallmouth bass expansion in the Yampa River during low flow conditions, which was followed by the decline of native fish including humpback chub.

Section 4.1.4 – In table 4, smallmouth bass are labeled "abundant" within the Deso/Gray population of humpback chub, however there is no discussion of the status of the species in the text. Given the risk that smallmouth bass pose to humpback chub populations, it may be worth a short discussion of the status of the species in Deso/Gray, the threat the species poses to that population, and any current control operations underway.

Section 4.1.7 – The population estimates for a few of the populations appear to be from 5 or more years ago (Yampa, Black Rocks, Westwater, Cataract), which would suggest some uncertainty in the conclusion of the sustainability of some of these populations. I recognize that monitoring may be continuing, and it may help to include a short mention of more recent catch rates, even if population estimates have not been completed. Also, when were the last captures of humpback chub recorded in the Yampa?

P. 50-53 – The reduction in annual flow variability post-Glen Canyon Dam may have also reduced isolated tributaries in Grand Canyon from the mainstem Colorado, including Havasu and Shinumo creeks.

I might suggest noting that warmer discharges from Glen Canyon Dam that have occurred more recently have warmed the lower river, which may have encouraged reproduction and rearing in western Grand Canyon (see Kegerries et al. 2016).

In the second paragraph from the top of the page, the report references Yackulic et al. (2014) in a discussion of the benefit of cold temperature to humpback chub. This is a complex situation, and I may suggest that there are additional factors and uncertainties to consider before coming to this conclusion. For example, the authors conclude that monthly survival is higher for most age classes in the colder Colorado River, but also recognize that conditions in the Colorado River during the period of study (2009 – 2012) were more favorable (warmer, fewer rainbow trout) than previous years, when humpback chub abundance was lower. In addition, I believe the SSA misquotes Yackulic et al. in stating that faster

recovery from spawning occurs in the colder water. There may be other factors than temperature to explain the difference in survival and longevity between the two habitats that could not be considered by Yackulic et al., including the lack of understanding of the abundance and impacts of warmwater nonnative fish residing in the Little Colorado River (catfish), foodbase differences, etc. The conclusion that cold water is a benefit to the Grand Canyon humpback chub was presented earlier in the SSA (p. 24), but it needs to be discussed in the proper context.

P. 63 – The NPS Comprehensive Fisheries Management Plan (CFMP) was actually completed in 2013 (NPS 2013). Under the CFMP, the NPS has been aggressively removing brown trout from a source population (Bright Angel Creek) for the past 5 years. Brown and rainbow trout abundance estimates have declined in the Creek (NPS data), and CPUE has declined in the mainstem (AZGFD data- Rogowski has included this in an annual monitoring report as well). I'm preparing the Bright Angel Creek report for a workshop in September.

On the bottom of page 63 there is a discussion of brown trout abundance in Glen/Grand Canyon which should include citations. Also, I don't believe the statement that brown trout increased after 2007 in Lees Ferry is correct. According to the latest AZGFD Lees Ferry monitoring report (Rogowski et al. 2017), the increase began to occur in 2013 or 2014.

P. 64 (top) – While true that mechanical nonnative fish control strategies are in place for Grand Canyon, it is uncertain if mechanical removal in the mainstem Colorado River would be effective during large rainbow trout recruitment years, and/or if brown trout continue to increase in abundance in Glen Canyon and other areas and expand into the Little Colorado River inflow reach.

P. 66 – The discussion of sampling in the lower Grand Canyon, and potential expansion of humpback chub there, would benefit from the discussion of additional data collected by the US Fish and Wildlife Service (USFWS) and BIO-West, Inc./ASIR, Inc./Reclamation/NPS (Albrecht et al. 2014, Kegerries et al. 2015, Kegerries et al. 2016) from 2014-2016. BIO-West, Inc./ASIR, Inc., contracted by Reclamation, collected larval and juvenile humpback chub, and along with USFWS sampling of increasing juvenile and subadult humpback chub, they identified the expansion and increase in the lower river beginning in 2014. The USFWS has submitted a paper describing these results, I believe, but BIO-West, Inc., has authored three reports describing the past three years of larval and small-bodied fish sampling in western Grand Canyon beginning in 2014 which documented the occurrence of larval humpback chub throughout the study area (below Lava Falls, to Lake Mead). The main point is that the expansion to western Grand Canyon and the lower river occurred earlier than 2016. These reports can be supplied, upon request.

P. 71, bullet number 5, "Habitat with **few nonnative predators and competitors**…" – It appears as this current condition category was rated as "moderate" based on the assumption that ongoing management can successfully reduce the threat of nonnative fish, such as catfish and smallmouth bass, to humpback chub. It would be helpful to have additional explanation of the success of current/ongoing management actions to justify this rating. Smallmouth bass were listed as "abundant" in the Deso/Gray population (table 4, page 39), which would suggest to me that this population is severely threatened, particularly if drought conditions occur and smallmouth bass further increase in number (as discussed on page 84-85, and then again on page 98). From an outsider's perspective, not being involved in the Upper Basin Recovery Program, it is unclear to me from the text that ongoing management can

successfully suppress this threat given the apparent impacts this species has had upon the Dinosaur/Yampa population.

P. 80- There is a general admission of poorly understood linkages between humpback chub reproductive success, etc., and environmental factors. Given this point, the conclusions about various aspects of habitat and demographics seem overly optimistic.

P. 105 – First paragraph at the top of the page, last sentence, states that the State of Arizona has restrictions for stocking nonnative fish into waters in and near Grand Canyon. The State is actually currently considering stocking of rainbow trout in Glen Canyon (upstream of Grand Canyon), which may result in take of humpback chub downstream, depending on numbers of trout, and frequency of stocking, and other factors (pending Section 7 consultation and other planning and compliance with federal laws). The sentence stating that the state has restrictions on stocking should be removed from the SSA, unless restrictions can be cited (I'm not aware of these State-imposed restrictions).

Species Viability

The use of the "lambda," or the intrinsic rate of population growth, is used to establish whether a population is self-sustainable, over a generation (8 years for the upper basin and 16 for Grand Canyon). I'm not sure this is the best methodology for addressing the growth of a population, and more explanation may be needed for how trends are split into phases.

For example, the conclusion that the Black Rocks and Westwater Canyon are self-sustaining based on this lambda analysis seems overly optimistic. For Black Rocks, the abundance trends were split over a period that is less than a generation, to conclude that the population has stabilized or is increasing at a rate of 5% in more recent times (between 2007-2012). The description of this analysis indicated that the time period of assessment would be at least a generation (8 years). By grouping the Black Rocks population estimates in this way, the recent trend is more heavily influenced by a single population estimate for 2007, which, along with uncertainty/imprecision in the point estimates, leads to the potential false conclusion of population growth. I may not fully understand the analysis, but the lack of population estimates for the past 5 years also indicates to me that there may be more uncertainty in the "sustainability" in the Black Rocks population than is described. Additional uncertainty is also introduced when the population estimates are grouped in phases, as shown by the wider confidence bounds for those estimates of lambda.

I have similar concerns related to the lambda analysis for the Westwater Canyon population estimates. By splitting the analysis into two time phases, the authors conclude that the population has stabilized, which may be true over the short term (less than a generation, and through 5 years ago-2012). I would point out that a similar period of "stability" occurred between 2000 and 2004, but then the population declined. This same decline could occur after 2012.

The conclusion that there are too many uncertainties or too few population estimates to estimate lambda for Deso/Gray and Cataract populations makes sense to me. Confidence intervals around those estimates are wide.

The discussion of the Dinosaur NM population references "recent" estimates from 2003-2004, but I would argue that those are not recent estimates, however further discussion mentions the lack of recent captures (Jones 2012-2014). Also, the population estimates reference Finney (2006), but I don't

believe there was a population estimate in that report because two few fish were captured, and some were questionably identified as humpback chub.

It seems appropriate to add the Yackulic et al. (2014) Grand Canyon population estimates to Table 12 on page 129, while specifying they were calculated using a different methodology.

Under the discussion of translocations, NPS-GRCA staff could offer some additional, more up-to-date information regarding the current status of humpback chub translocated to Havasu Creek. Recruitment to maturity has been documented through October of 2016. It doesn't necessarily change the main points made in the SSA however. We do have a mark-recapture population estimate for the Havasu Creek population, but it is not split into adult/sub-adult like other population estimates, so it may not be as useful. The latest population estimate for humpback chub in Havasu Creek in May, 2016 was 297 (95% C.I. 291 – 327). Annual population estimates are conducted, however the 2017 analysis has not been completed.

P. 136-137 (Wide Temperature Range for Growth) - See comments above, regarding a similar discussion on page 24.

<u>Risks and Uncertainties –</u>

Number 3, Pumping from Coconino Aquifer – The authors may need to double check this discussion and whether the Coconino aquifer connects to Havasu Creek or the LCR. Our hydrologists at Grand Canyon NP indicated to me that the water sources for both the LCR and Havasu were a separate, different aquifer ("R-aquifer"?) that is deeper than the Coconino.

There's a discussion of the impacts of increasing water temperature on the Grand Canyon humpback chub population, and a mention of brown trout increasing with warming water on page 145. Here's a useful reference as a example:

> Al-Chokhachy, R., D. Schmetterling, C. Clancy, P. Saffel, R. Kovach, L. Nyce, B. Liermann, W. Fredenberg, and R. Pierce. 2016. Are brown trout replacing or displacing bull trout populations in a changing climate? Canadian Journal of Fisheries and Aquatic Sciences 73(9): 1395-1404.

Population Trajectories (P. 147) – I agree with the conclusion in the summary under this heading, and it seems to be well-supported by the information in the rest of the document, including the recognition that there is uncertainty in the trajectory of upper basin populations.

Section 10, Efficacy of Management Actions (P. 148) – As stated in the document, the programs listed below this heading are critical to continue to conserve and recover the species. I might add that the efficacy of some management actions such as nonnative fish control under conditions that support high levels of recruitment of trout in Grand Canyon, may be uncertain.

U.S. Fish and Wildlife Service
Participation in Peer Review of the Status Assessment (SSA) Report
for the Humpback Chub (Gila cypha)

BACKGROUND INFORMATION
AND
CONFLICT OF INTEREST DISCLOSURE

NAME: __Craig Paukert_____ TELEPHONE: _573-882-3524_

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CURRENT EMPLOYER: _US Geological Survey_____

This form has two (2) parts:

Part I – Background Information, and;
Part II – Conflict of Interest Disclosure.

Please complete both parts, **sign** and **date** the form on the last page, and **return the form to** Joy Gober, U.S. Fish and Wildlife Service, 1363 County Road 219, Richland Springs, Texas 76871, or by email to joy_gober@fws.gov. **Please retain a copy for your records**.

PART I
BACKGROUND INFORMATION

INSTRUCTIONS

Please provide the information requested below regarding **relevant** organizational affiliations, government service, public statements and positions, research support, and additional information (if any). Information is "relevant" if it is related to -- and might reasonably be of interest to others concerning -- your knowledge, experience, and personal perspectives regarding the subject matter for which this form is being completed. If some or all of the requested information is contained in your curriculum

vitae (CV), you may prefer to simply attach your CV to this form, supplemented by additional responses or comments below as necessary.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant business relationships (as an employee, owner, officer, director, consultant, etc.) and your relevant remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups, etc.).

I am a member of the American Fisheries Society and the Desert Fishes Council.

II. GOVERNMENT SERVICE. Report your relevant service (full-time or part-time) with federal, state, or local government in the United States (including elected or appointed positions, employment, advisory board memberships, military service, etc.).

I was employed by the USGS Grand Canyon Monitoring and Research Center from 2001 to 2003. I am currently employed by USGS, Cooperative Research Units Program.

III. RESEARCH SUPPORT. Report relevant information regarding both public and private sources of research support (other than your present employer), including sources of funding, equipment, facilities, etc.

Paukert, C. P., J. B. Whittier, J. Millspaugh, and R. Gitzen. Evaluation of Humpback Chub Translocations and Native Fish Community Restoration in Grand Canyon Tributaries. National Park Service, Grand Canyon National Park (2010-2013).

Paukert, C., J. Kershner, D. Infante, S. Hostetler, J. Whittier, L. Johnson, L. Wang, T. Wagner, P. Ferreri, J. Olden, P. Jacobson, D. Pereira, and G. Whelan. Managing the nations fish habitat at multiple spatial scales in a rapidly changing climate. U.S Geological Survey, National Climate Change and Wildlife Science Center. (2009-2012).

Paukert, C. P., J. B. Whittier, and J. D. Olden. Conservation planning for fishes in the Upper Colorado River Basin. U.S. Geological Survey, National Biological Information Infrastructure (2009-2013).

Paukert, C. P. Competition between native and non-native fishes in Bright Angel Creek: implications for humpback chub recovery. U.S. Geological Survey/National Park Service, Natural Resources Preservation Program. (2009-2012).

Paukert, C. P., J. D. Olden, and J. B. Whittier. Development and validation of models to assess the threat to freshwater fishes from environmental change and invasive species. U.S. Geological Survey, Status and Trends Program (2008-2011).

Paukert, C. P., P. J. Sponholtz, and D. L. Ward. 2003. Effects of handling on bonytail. U. S. Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center, Flagstaff, Arizona. (2003-2004).

IV. PUBLIC STATEMENTS AND POSITIONS. List your relevant articles, testimony, speeches, etc., by date, title, and publication (if any) in which they appeared, or provide relevant representative examples if numerous. Provide a brief description of relevant positions of any organizations or groups with which you are closely identified or associated.

- Spurgeon, J. J., C. P. Paukert, B. D. Healy, M. Trammell, D. Speas, and E. Omana-Smith. 2015. Translocation of Humpback Chub into tributary streams of the Colorado River: implications for conservation of large river fishes. Transactions of the American Fisheries Society 144:502-514.
- Spurgeon, J. J., C. P. Paukert, B. D. Healy, C. A. Kelley, and D. P. Whiting. 2015. Can translocated native fishes retain their trophic niche when confronted with a resident invasive? Ecology of Freshwater Fish 24:456-466.
- Whiting, D. P., C. P. Paukert B. D. Healy, and J. J. Spurgeon. 2014. Macroinvertebrate prey availability and food web dynamics of non-native trout in a Colorado River tributary, Grand Canyon. Freshwater Science 33:872-884.
- Strecker, A., J. Olden, J. Whittier, and C. Paukert. 2011. Defining conservation priorities for freshwater fishes according to taxonomic, functional, and phylogenetic diversity. Ecological Applications 21:3002-3013.

- Paukert, C. P., K. L. Pitts, J. B. Whittier, and J. D. Olden. 2011. Development and assessment of a landscape-level ecological threat index of the Lower Colorado River Basin. Ecological Indicators 11:304-310
- Pool, T. K., J. D. Olden, J. B. Whittier, and C. P. Paukert. 2010. Environmental drivers of fish functional diversity and composition in the Lower Colorado River Basin. Canadian Journal of Fisheries and Aquatic Sciences 67:1791-1807.
- Petersen, J. H., D. L. DeAngelis, and C. P. Paukert. 2008. Developing bioenergetics and life history models for rare and endangered species. Transactions of the American Fisheries Society 137:244-253.
- Paukert, C. P., and J. H. Petersen. 2007. Simulated effects of temperature warming on rainbow trout and humpback chub in the Colorado River, Grand Canyon. Southwestern Naturalist 52:234-242.
- Paukert, C. P. 2004. Comparison of electrofishing and trammel netting variability for sampling native fishes. Journal of Fish Biology 65:1643-1652.

V. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the topics addressed in the Species Status Assessment Report, and therefore might constitute an actual or potential source of bias, please describe them briefly.

None.

PART II
CONFLICT OF INTEREST DISCLOSURE

INSTRUCTIONS

It is essential that a peer reviewer used by the U.S. Fish and Wildlife Service as part of its peer review of Species Status Assessments under the ESA not be compromised by conflict of interest. For this purpose, **the term "conflict of interest" means any financial or other interest which conflicts with the service of the individual because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization.**[1] Except for those situations in which the Service determines that a conflict of interest is unavoidable and promptly and publicly discloses the conflict of interest, no individual can participate in a peer review process used by the Service in a Species Status Assessment if the individual has a conflict of interest that is relevant to the functions to be performed.

The term "conflict of interest" means something more than individual bias. There must be an *interest* that could be directly affected by your participation as a peer reviewer.

Conflict of interest requirements are *objective* and *prophylactic*. They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Conflict of interest requirements are objective standards designed to eliminate certain specific, potentially compromising situations from arising, and thereby to protect the individual, the Service, and the public interest. The individual and the Service should not be placed in a situation where others could reasonably question, and perhaps discount or dismiss, the information produced through the peer review simply because of the existence of conflicting interests.

The term "conflict of interest" applies only to *current interests*. It does not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future but do not currently exist, because such future interests are inherently speculative and uncertain. For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is <u>not</u> a current interest.

The term "conflict of interest" applies not only to the personal interests of the individual but also to the *interests of others* with whom the individual has substantial common financial or other interests if these interests are relevant to the functions to be performed. Thus, in assessing an individual's potential conflicts of interest, consideration

[1] This definition and the other information in these instructions are drawn from the National Academy of Sciences Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports (May 12, 2003).

must be given not only to the interests of the individual but also to the interests of the individual's spouse and minor children, the individual's employer, the individual's business partners, and others with whom the individual has substantial common financial or other interests. Consideration must also be given to the interests of those for whom one is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

Such interests could include an individual's stock holdings in excess of $10,000 in a potentially affected company or being an officer, director, or employee of the company. Serving as a consultant to the company could constitute such an interest if the consulting relationship with the company could be directly affected or is directly related to the subject matter of the regulatory process.

An individual's other possible interests might include, for example, relevant patents and other forms of intellectual property, serving as an expert witness in litigation directly related to the subject matter of the regulatory process, or receiving research funding from a party that would be directly affected by the regulatory process if the research funding could be directly affected or is directly related to the subject matter of the regulatory process and the right to independently conduct and publish the results of this research is limited by the sponsor. Consideration would also need to be given to the interests of others with whom the individual has substantial common financial interests -- particularly spouses, employers, clients, and business or research partners.

The following questions are designed to elicit information from you concerning possible conflicts of interest that are relevant to the functions to be performed by your peer review.

1. EMPLOYMENT. (a) If the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the Great Sand Dunes tiger beetle --

(i) If you are employed or self-employed, could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected?

(ii) To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) clients and/or business partners be directly affected?

(iii) If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected?

(iv) If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships?

(v) Regardless of the potential effect on the consulting relationship, do you have any current or continuing consulting relationships (including, for example, commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, serving as an expert witness in litigation, or providing services in exchange for honorariums and travel expense reimbursements) that are directly related to the subject matter of the possible government regulatory action or inaction?

(b) If you are or have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal conflict of interest restrictions that may be applicable to your service in connection with this peer review?

(c) If you are a U.S. Government employee, are you currently employed by the Service?

If the answer to all of the above questions under EMPLOYMENT is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under EMPLOYMENT is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

2. INVESTMENT INTERESTS. Taking into account stocks, bonds, and other financial instruments and investments including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than $10,000), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the Great Sand Dunes tiger beetle --

(a) Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments?

(b) Do you have any other significant financial investments or interests such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or personal investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments?

If the answer to all of the above questions under INVESTMENT INTERESTS is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under INVESTMENT INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

3. PROPERTY INTERESTS. Taking into account real estate and other tangible property interests, as well as intellectual property (patents, copyrights, etc.) interests, if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the Great Sand Dunes tiger beetle --

(a) Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected?

(b) To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, etc.) own directly or indirectly any such property interests that could be directly affected?

If the answer to all of the above questions under PROPERTY INTERESTS is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under PROPERTY INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

4. RESEARCH FUNDING AND OTHER INTERESTS. (a) Taking into account your research funding and other research support (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel, etc.), if the information received by the Service through the peer review process were to provide the basis for government regulatory action or inaction with respect to the Great Sand Dunes tiger beetle --

> (i) Could the research funding and support for you or your close research colleagues and collaborators be directly affected, or
>
> (ii) If you have any research agreements for current or continuing research funding or support from any party whose financial interests could be directly affected, and such funding or support is directly related to the subject matter of the regulatory process, do such agreements significantly limit your ability to independently conduct and publish the results of your research?

(b) Is the central purpose of the Species Status Assessment Report for which this disclosure form is being prepared a critical review and evaluation of your own work or that of your employer?

(c) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the Species Status Assessment Report?

(d) To the best of your knowledge, will your participation in this peer review process enable you to obtain access to a competitor's or potential competitor's confidential proprietary information?

(e) Could your service as a peer reviewer create a specific financial or commercial competitive advantage for you or others with whom you have substantial common financial interests?

If the answer to all of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is either "no" or "not applicable," check here __X___ (NO).

If the answer to any of the above questions under RESEARCH FUNDING OR OTHER INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances below.

EXPLANATION OF "YES" RESPONSES:

During your period of service in connection with the activity for which this form is being completed, any changes in the information reported, or any new information, which needs to be reported, should be reported promptly by written or electronic communication to the responsible staff officer.

20 September 2017

YOUR SIGNATURE

DATE

Received by: Joy Gober

Joy Gober
U.S. Fish and Wildlife Service
Mountain Prairie Regional Office
Ecological Services

Date

09/25/2017

22 September 2017

RE: Review of the Species Status Assessment For the Humpback Chub (*Gila cypha*)

I have reviewed the Species Status Assessment For the Humpback Chub (*Gila cypha*) and found it to be a very comprehensive document that summarizes the status and trends, as well as the threats and uncertainties that will aid in the continued recovery of the species. I was well aware of several of the assessments of Humpback Chub (HBC), but was impressed at the overall thoroughness and quality of science in the report.

Below are some comments to consider. I would label most of these comments as minor.

In general, there are several statements that suggest food availability is sufficient for HBC, particularly in the Upper Basin (e.g., page v). This may be true for the current population size but I would be cautious making this statement if HBC population may increase. So food supply may be adequate for the current population size, but could it be inadequate if the population size increases?

I was impressed at the depth of the analysis of all the HBC populations, and the decision to not use some data that may be a concern. For example, page 120 indicates that the 2001-2203 population estimate for Desolation and Gray canyons were imprecise that therefore not used. I am glad to see that level of scrutiny in the data analysis.

Page 16 and 32: Although HBC may spawn at a wide range of flows, do we know what it is about those flows that make them spawn? For example, do they spawn on the descending limb of a hydrograph? Does the flow trigger have to be a certain percentage above a base flow? Page 83 states that HBC may not be affected by annual flow magnitude. However, what about inter-annual flows (e.g., spring peak, summer steady flows, etc.?). These are tough questions and we may not know the answer. However, my concern in stating that they spawn under a variety of flows may suggest flows are not that important. Also, the statement of page 16 lists the various flows (e.g., 65-60,000 cfs). However, would it be better to put this in the context of the river where they spawned? For example, can you also provide what percentage of 'base' flows was needed to spawn? Is a 65 cfs in Havasu Creek the same magnitude as 19,000 cfs in the Colorado River in Grand Canyon? Table 2 (page 17) provides a nice summary of flows linked to HBC spawning. For example, in Black Rocks they spawn anywhere from 3,000 to 60,000 cfs. What I wonder is if (for example) 1981 was a dry year so the spawning at 3-5,000 cfs was similar to a wet year(s) where fish spawned at high flows (e.g., 14,000-60,000 cfs).

Page 28-31 (Figures 8-10). These are great visuals of HBC habitat!

Page 53, second paragraph. Warmer water in Grand Canyon may actually increase HBC growth while at the same time limiting rainbow trout growth and thus reduce the number of days HBC are vulnerable to predation by rainbow trout (Paukert and Petersen 2007). One caveat is that this study just compared rainbow trout and HBC, and does not factor in warming may also increase nonnative predators in the system.

Paukert, C. P., and J. H. Petersen. 2007. Simulated effects of temperature warming on rainbow trout and humpback chub in the Colorado River, Grand Canyon. Southwestern Naturalist 52:234-242. (PDF)

Page 61: Although HBC are omnivorous and may consume small fish on occasion, we found in Shinumo Creek that translocated HBC had a large part of their diet as fish (Spurgeon et al. 2015). Note this was for Shinumo Creek and not the mainstem population. This study also shows that HBC likely compete with rainbow trout as well in this system (page 88, last paragraph).

Spurgeon, J. J., *C. P. Paukert*, B. D. Healy, C. A. Kelley, and D. P. Whiting. 2015. Can translocated native fishes retain their trophic niche when confronted with a resident invasive? Ecology of Freshwater Fish 24:456-466. (PDF)

One of the general conclusions is that the HBC population in Grand Canyon is increasing and has been increasing since about 2001 or so. This is obviously good news. The report suggests this may be a result of warming temperature in the mainstem Colorado River. Is it possible to tease out if this is warming, or removal of nonnative fishes in the mainstem? I suspect not but would be useful information if we knew the mechanisms.

The report states that the biologically meaningful timeframe will be 16 years (page 78). I understand this is two generations, but personally think having a timeframe that is longer better matches some of the other data in your report. For example, pages 78-79 discus changes in precipitation, and one statement indicates evaporation will increase 2-6 fold by 2080 (63 years in the future). Page 80 (Figure 26) shows a time series form 1890-2004 (114 years). Page 111 (3rd paragraph) indicated monitoring is at most 21 years and is only 1.4 to 2.6 generation times (suggesting that this is a relatively short time frame). I believe these time series are useful, so I wonder why limit your biologically meaningful timeframe to 2 generations?

Page 104: I was surprised to learn that the Lower Colorado River MSCP does not contain a nonnative fish removal component. Any idea why? Given predation and competition by nonnative fishes may be the (or one of the) most important threat to many HBC populations, having a nonnative control plan would seem critical.

Page 105, bullet 6: Any idea why there are few PIT tagged fish moving upstream? Is this because they do not want/need to move upstream, or is it a behavioral issue about the design of the fish passage structure? That is, with a different fish passage design (or a free flowing river) would they move upstream? I know there is substantial research on behavioral responses to fish passage for salmonids but did not know if this is the case for HBC or similar species.

Page 132, last paragraph: the report states that 'some' translocated fish in Shinumo and have descended to the mainstem Colorado River. If you want to quantify this, Spurgeon et al. 2015 shows at least 53% left Shinumo (35% left within the first 25 days of translocation):

Spurgeon, J. J., *C. P. Paukert,* B. D. Healy, M. Trammell, D. Speas, and E. Omana-Smith. 2015. Translocation of Humpback Chub into tributary streams of the Colorado River: implications for conservation of large river fishes. Transactions of the American Fisheries Society 144:502-514. (PDF)

Page 139, bullet 4: Would you also include the 2014 ash flows in Shinumo Creek?

Overall I found no major flaws in the report and believe it is an excellent review of the science and status of HBC. I am particularly impressed with the population level accounts and status. The above comments I believe are relatively minor and thus are for the author's consideration but not any fatal flaws in the science.

If you have any questions feel free to contact me.

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