



Tule Lake and Lower Klamath Refuges Habitat Conditions

2022



First A Huge Thanks

- Refuge Staff – For all the work they do to support wetlands and waterfowl
- California Waterfowl Association (CWA) for their continued support with banding, disease management, and advocacy
- Ducks Unlimited (DU) for their continued advocacy and support with infrastructure upgrades
- Cal-Ore Wetlands & Waterfowl Council (CalOre) for their continued support and advocacy of the refuges
- Everyone who cares enough to request information or provide feedback



Klamath Basin National Wildlife Refuge Complex

The Klamath basin National Wildlife Refuge Complex is made up of six Refuges in the Klamath Basin that include Tule Lake, Upper Klamath, Lower Klamath, Klamath Marsh, Bear Valley, and Clear Lake, whose combined mission is to protect what remains of what once was the largest wetlands area west of the Mississippi River. These surviving wetlands remain a highly managed yet critical part of the Pacific Flyway, a place where migrating waterfowl can rest and refuel.



The Kuchel Act and Management of Your Refuges

After nearly a decade of debate between agricultural interests and conservationists over the future of the refuges, The Kuchel Act of 1964 dedicated the lands within the boundaries of Tule Lake and Lower Klamath NWRs to wildlife conservation for the purpose of waterfowl management, with a mandate of continuing an agricultural leasing program consistent with “proper waterfowl management”

At a time, when agricultural crops were viewed as a requirement for waterfowl in the Klamath Basin, and Tule Lake and Lower Klamath NWRs held unparalleled fall waterfowl populations of 5 to 7 million birds, the bill was viewed as a win-win solution.

The debate continues to this day



Setting the Stage for Discussion

- The Klamath Basin is entering a third year of severe drought and water shortages. Habitat conditions are the worst they have ever been
- Drought conditions are impacting everyone - Klamath basin wetlands, waterbirds, fish, and communities (Tribes, conservation, recreation, agriculture) are all suffering due to the challenges around water availability and delivery
- The Klamath Basin is losing wetlands at a rapid rate both the physical loss of acres and functional loss of flooded habitat
- National Wildlife Refuges in the Klamath Basin continue to face the greatest threats they have experienced since the 1920's. Waterbird populations are not only the lowest in the refuge's history but importantly Klamath Basin wide indicating a collapse of the most important staging area in the Pacific Flyway.
- The Klamath Basin is not alone! Drought conditions are plaguing the western United States and at this time there is concern that little wetland habitat will be available to support fall staging and wintering waterbirds in the Pacific Flyway
- The refuge's goal is to increase the staging population of migrating waterfowl on LKNWR and TLNWR
- Refuge staff want to increase the value of these refuges throughout the year with special consideration on increasing waterbird populations during the Spring breeding and fall migration months.





Recreational Use

- Tule Lake & Lower Klamath Refuges average greater than 170k visitors per year.
- Refuge managers do their best to balance the needs of wildlife, wetland preservation, and people
- Six wildlife-dependent recreational uses are allowed when they are compatible with a refuge's purpose. They include hunting, fishing, wildlife observation, photography, environmental education, and interpretation
- A recreational use is compatible when it:
 - Does not conflict with fish and wildlife habitat goals or objectives, and promotes public understanding and appreciation for the role of managers in managing and protecting these resources
 - Develops the public's understanding of, and appreciation for, their role in the conservation of our nation's fish and wildlife resources
- Habitat and water management is based on waterbird needs first
- Refuge staff is aware that not every management decision is going to be supported by all user groups
- We hope that this presentation will help alleviate some anxiety and frustration





Water is Everything

- The current biological opinion has effectively modelled LKNWR out of the fall migration picture by reducing water deliveries to both LKNWR and TLNWR to a level that proper waterfowl and wetland management is impossible
- Even in the best of the recent water years delivery of water has been 50% or less of the volume needed to properly manage the LKNWR for waterbirds
- Water delivery is not occurring or when it does is too late to effectively match habitat with waterbird needs
- Water availability is now an issue at TLNWR where the greatest flexibility of water management has historically occurred. Summer and Fall 2022 will mark the first time in the refuge's history that both Sump 1A and 1B will be dry and unavailable for nesting, molting, and migrating waterbirds. This impacts wetlands, endangered species habitat, public recreation, waterbirds and the agricultural community which provides leave and waste grain to help support waterbirds, pheasants, and non-game wildlife
- Without appropriate water deliveries waterbird populations are going to continue to decline, this directly impacts recreational opportunities, such as hunting, wildlife viewing, photography, and environmental education
- While some take issue with refuge management, if the water issues are not solved everyone loses



Water is Everything Cont.

- Recent publications by Intermountain West Joint Venture indicate the biggest limiting factor for fall migrating waterfowl in the Pacific Flyway is the availability of water on Public Managed lands and wetlands are transitioning to shorter periods of availability due to water scarcity.

<https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.2758>

<https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15010>

<https://www.frontiersin.org/articles/10.3389/fevo.2022.844278/full>

The Big Picture

- Most of the Western United States is experiencing some level of drought
- Wetland habitat throughout the western mid-continent is likely going to be extremely limited
- It is anticipated that core waterbird areas are going to be dry or experiencing extremely reduced habitat availability
- It is uncertain at this time what the impact to migratory waterbirds might be
- However, limited habitat can lead to concentrated populations which facilitates disease outbreaks, reduced food resources, and increased disturbance

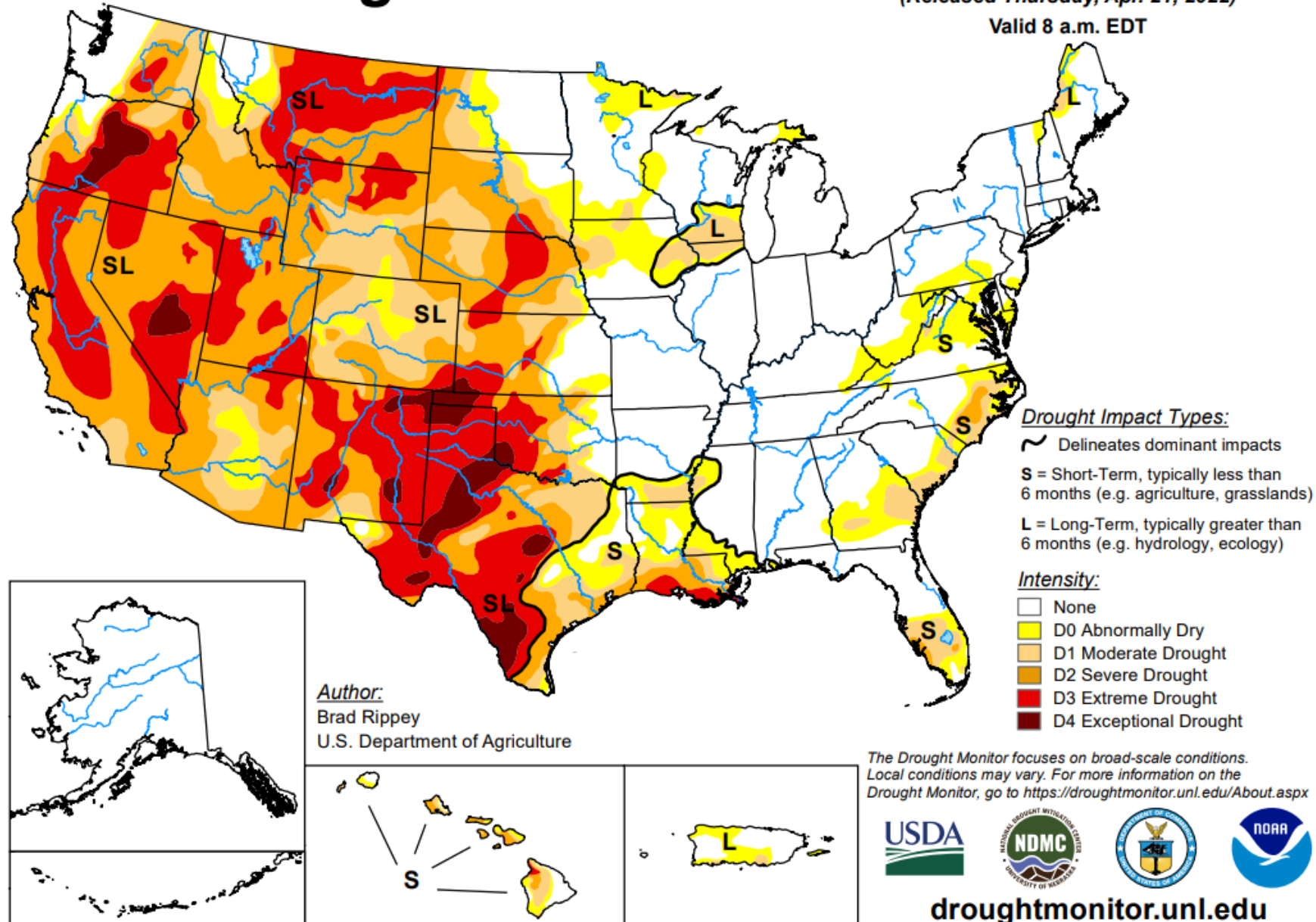


U.S. Drought Monitor

April 19, 2022

(Released Thursday, Apr. 21, 2022)

Valid 8 a.m. EDT





Your Input Matters

We Implement Your Ideas and Address Concerns

- We addressed the stripped leave grain issue and adjusted the program to ensure spacing requests brought up by hunting community
- We continue to address field access points and parking areas
- We produced new map and regulation product to make rules and boundaries more clear
- We have removed spoil piles throughout Sump 1A, widened and deepened the lost river channel through 1A, and are now beginning rehabilitation of smaller channels
- We have been rehabilitating levees, fixing ditches and trying to increase the amount of land that can be managed when it has water
- We are installing new pumps to more efficiently manage the limited water we receive.





General Complaints From This Year

- WATER
 - There wasn't any
 - We did not flood
 - Why was flooding occurring on the Oregon side while no water was being delivered to the California side (LK and TL)
- Grain Leave Program
 - There was too much standing grain this year – Birds won't use it and people can't effectively hunt it
- Disturbance
 - General public driving in restricted areas disrupting hunts
 - This was especially problematic for pheasant hunters
 - People not obeying road closures, or those roads were not adequately posted as closed
 - Not enough signage or inconsistent signage
 - Afternoon scouting pushing birds out of feeding areas
- Behavior
 - High shooting
 - Racing for hunting spots
 - Accessing closed zones, shooting in closed zones
- Refuge Decisions
 - Sump 1B closure
- Hunt Program decisions

All of these concerns will be addressed
in this report





In General, 2021/2022

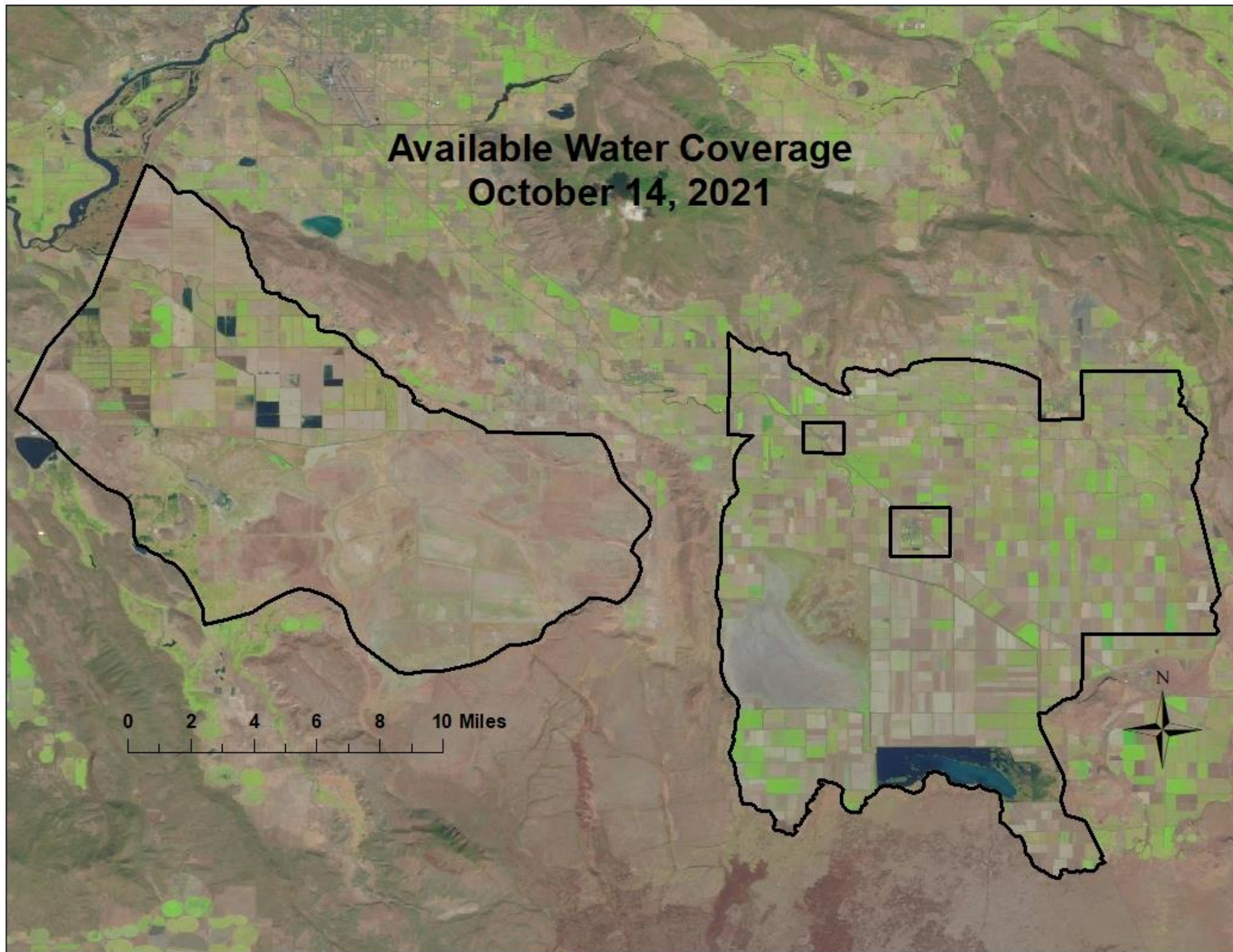
No water meant no habitat for birds.

This affected birds, refuge visitors, and everyone that enjoys these refuges in the fall and winter and will have a big impact on our agricultural partners and recovery strategies for endemic sucker species.

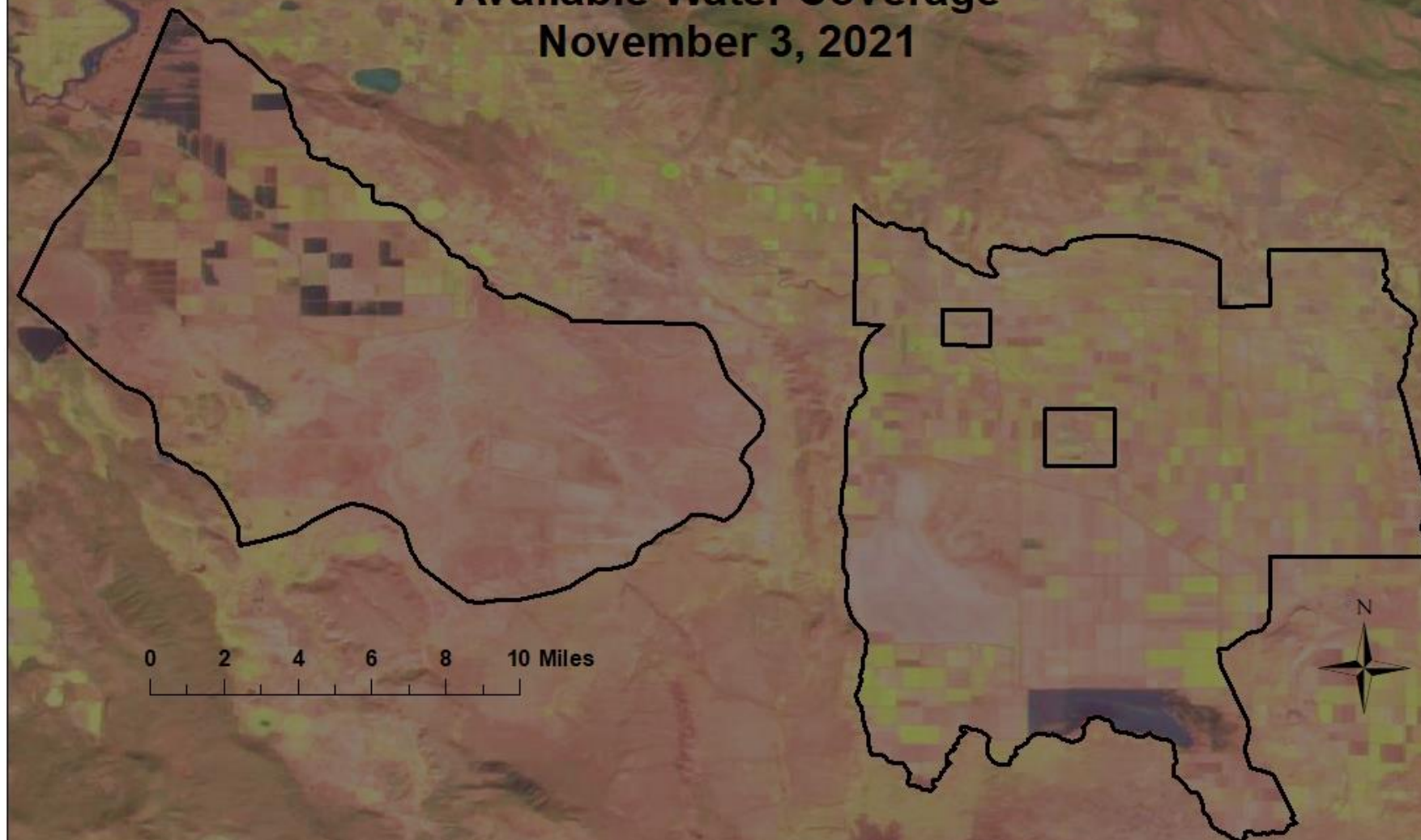
- Water delivery was worse than predicted
- Despite poor water, Refuge staff and CWA banded over 4,000 birds early in the summer
 - Band returns have come back from 7 different states and Mexico this fall with most birds being harvested in the Central Valley
- Botulism was for the most part absent across the Refuge Complex.
 - The collaborative efforts of local agricultural producers to move well water into 1B and facilitate the emergency delivery of water in late August contributed to preventing conditions that may have initiated an outbreak
- Poor water delivery reduced habitat availability and resulted in the lowest fall/winter waterfowl populations in recorded history (illustrated in following water availability slides)
- The 2021/2022 fall habitat conditions, waterfowl populations and recreational opportunities were horrible
- Numerous stakeholders have come together to help find solutions for the water challenges of the refuges including the Klamath Tribes, state wildlife agencies, conservation NGO's, the agricultural community, media, hunters, birders, photographers, and more.

**Available Water Coverage
October 14, 2021**

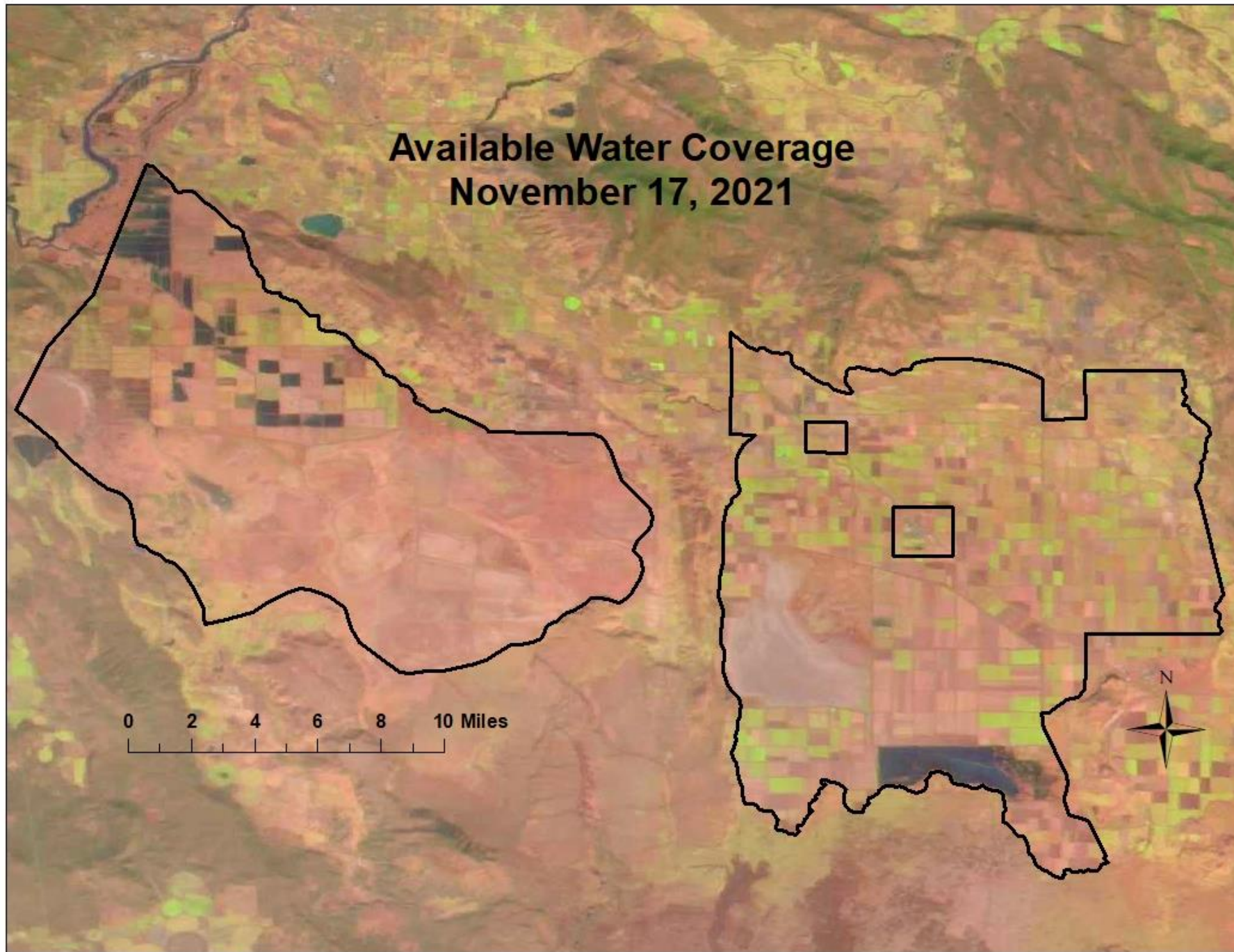
0 2 4 6 8 10 Miles



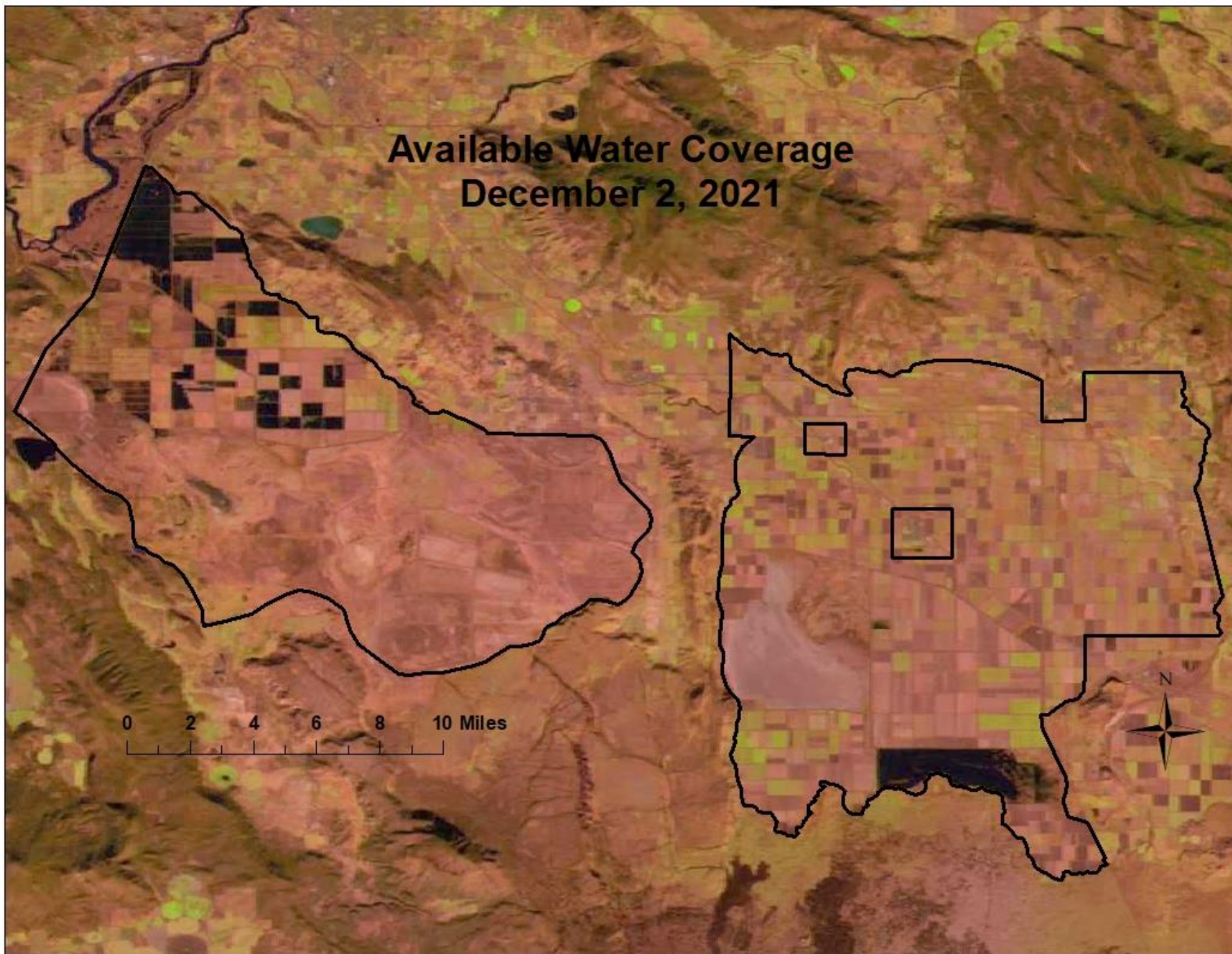
**Available Water Coverage
November 3, 2021**



**Available Water Coverage
November 17, 2021**



**Available Water Coverage
December 2, 2021**





Lower Klamath NWR

- Water Report
- Fall Waterfowl Population
- 2022/2023 Outlook





Lower Klamath NWR

Fall 2020 Water Delivery

- LKNWR effectively received no water during the summer and fall of 2021
 - Unit 2 was reduced to roughly 100 acres
- The limited water the refuge did receive was not enough to maintain Unit 2 through most of the summer and fall
 - CWA worked to acquire water transfer from upper wood river basin
 - ADY deliveries via CWA transferred water were ~ 600 AF
 - The refuge received no fall deliveries so no additional wetland habitat could be flooded
 - D-Plant deliveries were zero
 - Acres Flooded going into fall was around 200
 - Independent pumping of drains by agricultural producers did result in flooding of numerous fields in the Straits Units and this helped support a small numbers of birds throughout the migration period however estimates of total flooded acres are not available





Fall Population

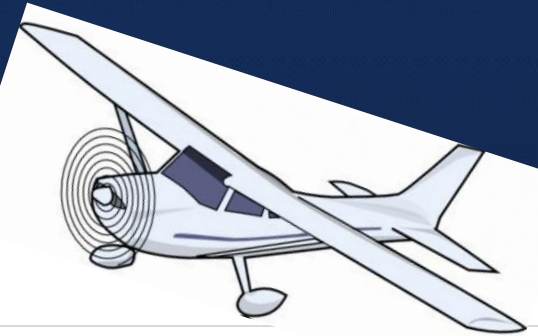
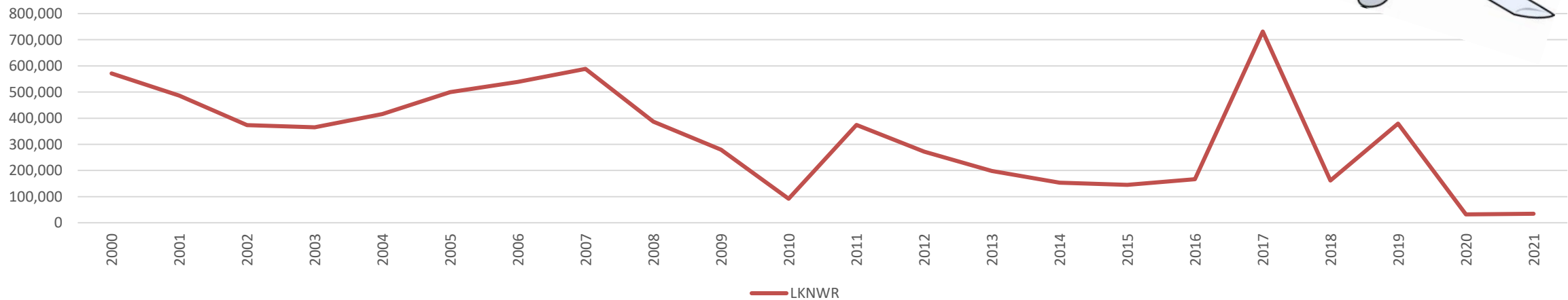
- Four aerial surveys were flown fall 2021, inclement weather prevented late winter surveys but we believe the peak of migration was captured
- Peak fall duck population was 34,294 on Oct 14, 2021 (8% higher than 2019).
- Average duck population over the fall migration was 24,265.
- Peak fall goose population was 5,134 on Nov 3 and 21, 2021 (41% higher than 2021)
- LKNWR is well below the long-term average and population goals established in the North American Waterfowl Management Plan



(Waterfowl populations represent off refuge counts as well, for 2022 the majority of birds were observed off refuge)

**Population estimates only reflect survey days.*

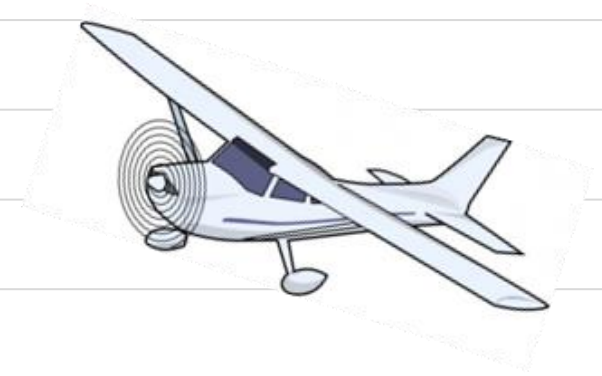
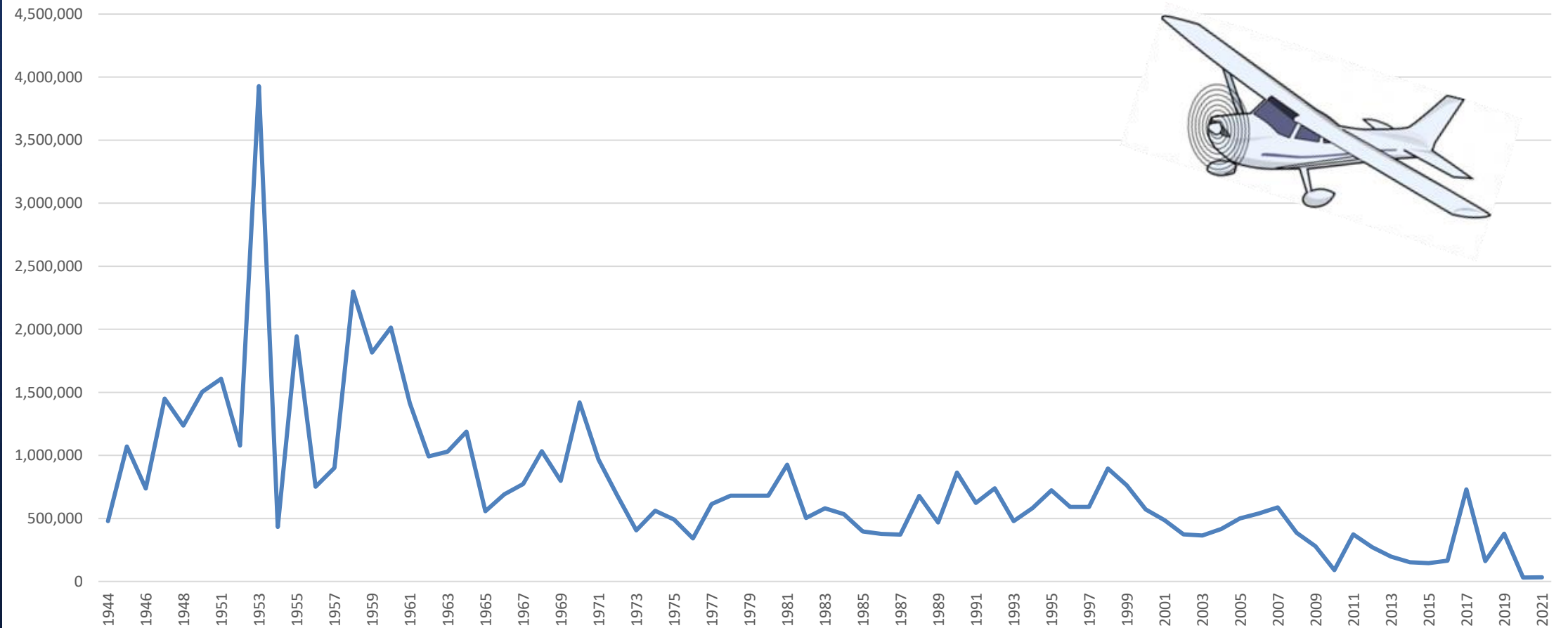
Lower Klamath NWR Peak Fall Duck Counts
2000 - 2021





Long Term Peak Fall Duck Counts Lower Klamath NWR

Lower Klamath NWR Peak Fall Duck Counts
1944 - 2021





Lower Klamath Complex October 14, 2021 Ducks - 17,288

* Population represents ducks counted during flight; actual population estimate is 2X observed number

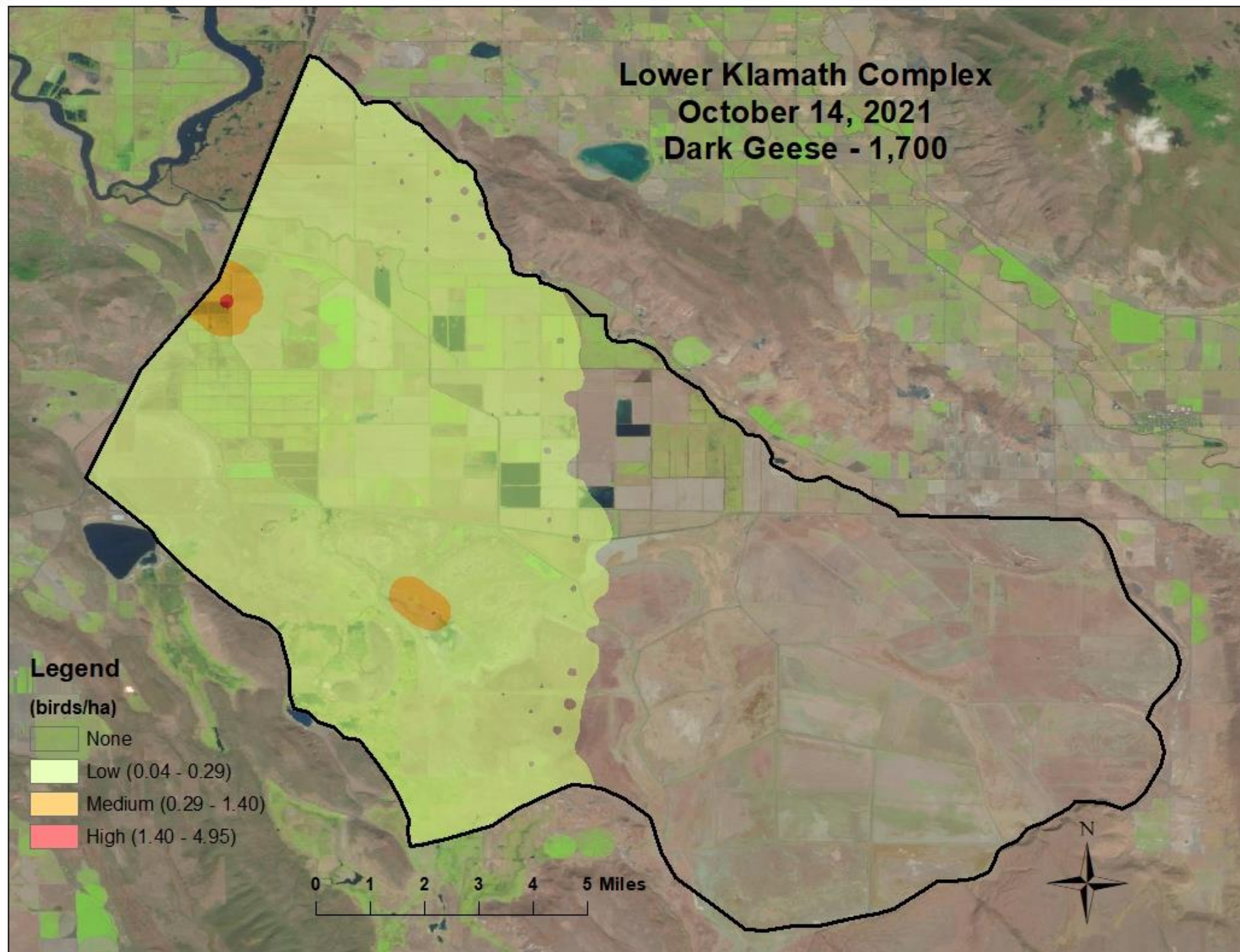
Legend

(birds/ha)

- None
- Low (0.15 - 4.48)
- Medium (4.48 - 19.39)
- High (19.39 - 76.09)

0 1 2 3 4 5 Miles







Lower Klamath Complex November 3, 2021 Ducks - 12,608

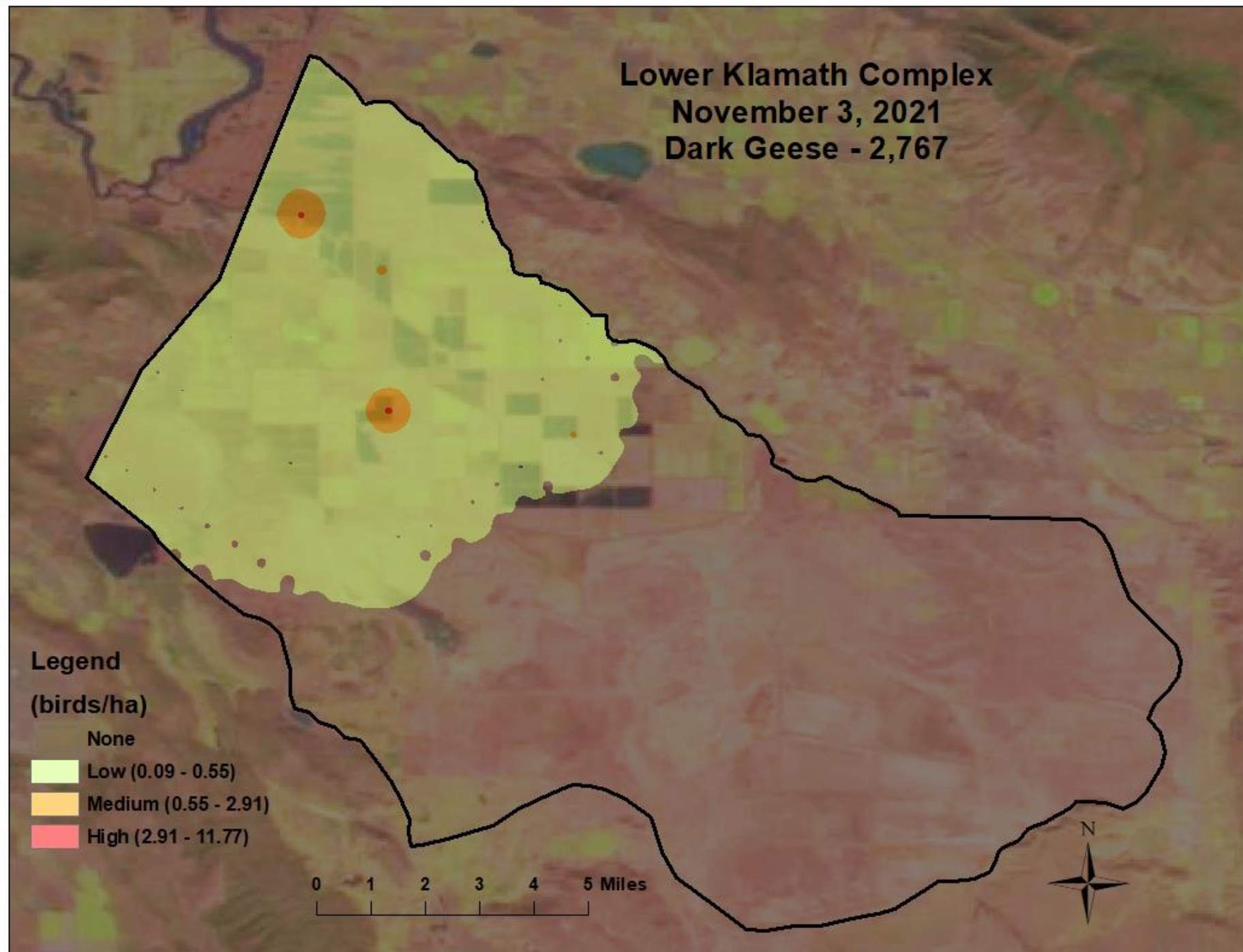
* Population represents ducks counted during flight; actual population estimate is 2X observed number

Legend

- None
- Low (0.15 - 3.28)
- Medium (3.28 - 12.48)
- High (12.48 - 41.86)

0 1 2 3 4 5 Miles







Lower Klamath Complex November 17, 2021 Ducks - 14,020

* Population represents ducks counted during flight; actual population estimate is 2X observed number

Legend

(birds/ha)

- None
- Low (0.15 - 2.62)
- Medium (2.62 - 7.22)
- High (7.22 - 26.69)


0 1 2 3 4 5 Miles



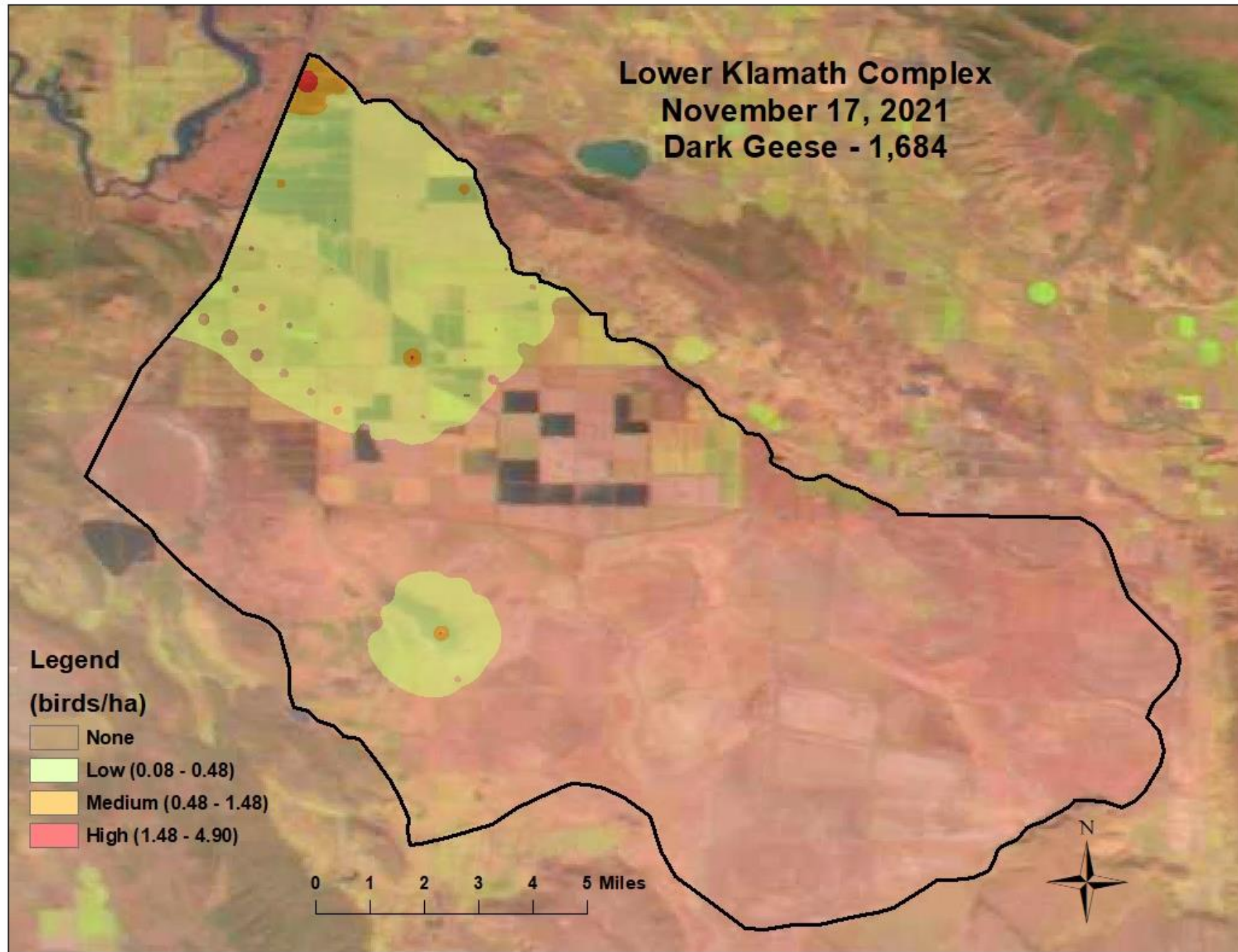


Lower Klamath Complex
November 17, 2021
Dark Geese - 1,684

Legend
(birds/ha)

-  None
-  Low (0.08 - 0.48)
-  Medium (0.48 - 1.48)
-  High (1.48 - 4.90)

0 1 2 3 4 5 Miles





Lower Klamath Complex December 2, 2021 Ducks - 4,914

* Population represents ducks counted during flight; actual population estimate is 2X observed number

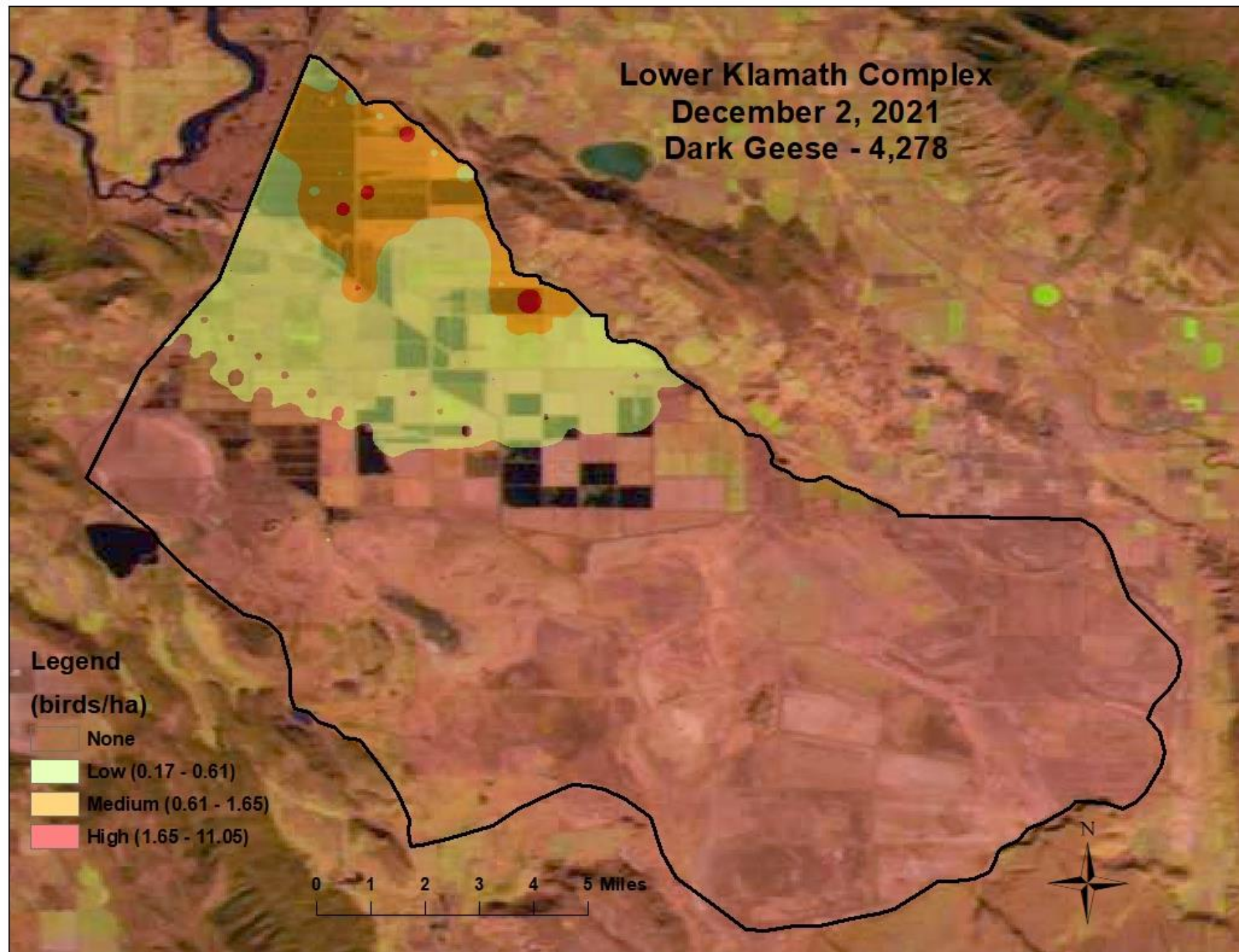
Legend

(birds/ha)

- None
- Low (0.15 - 0.56)
- Medium (0.56 - 1.19)
- High (1.19 - 9.50)

0 1 2 3 4 5 Miles







Lower Klamath NWR Summary

- Water (timing, amount, duration) continues to be the single biggest issue impacting wetland habitat and waterbird populations at LKNWR.
- At the time of this report, LKNWR is expected to receive zero water
- Despite frustrations with refuge management decisions, conditions will not improve until better water deliveries are received
- If we want to see waterbird populations recover LKNWR needs adequate and reliable summer/fall deliveries to increase the number of permanent wetlands on the refuge
 - Increases local production (especially mallards which are critical for California and population modelling for the Pacific Flyway)
 - Increases the visible attraction for migrating waterfowl which results in more staging birds
 - Provides better sanctuary areas for birds to avoid disturbance
 - Increases flexibility in water to manage food resources more appropriately

If water deliveries do not improve waterfowl populations are not going to recover. This has and will continue to affect the opportunity and quality of recreational opportunities on LKNWR and surrounding lands



Outlook for 2022/2023 Season

- Water availability for the 2022 water year is currently predicted to be worse than 2021.
- Wood River water transfer was finalized but water was delivered for only 5 days in 2021.
- The refuges transferred water right from Upper Klamath NWR has been terminated.
- Only ~700 acre feet of winter water was delivered after December 2022. The bulk of the refuges winter water was used to pay back the emergency transfer of water delivered to Sump 1B earlier in the summer
 - Under the 2019 Biological Opinion LKNWR is modelled out of all river water deliveries until December
 - December deliveries can be curtailed if the Central Tendency on the elevation of Upper Klamath Lake is not positive towards the lake filling (as was the case this past year)
 - USBOR considers the remaining project supply as “Discretionary Water” whether it is or is not used to support refuge water needs is completely up to them
 - As a result, there is no way to predict if and how much water the refuge will receive through the ADY this fall but at the time of this report there is a strong likelihood LKNWR will receive no water for the fall migration
- The refuge was able to pump ~1,390 Acre feet of KDD drain water into unit 2 in March 2022
- It is certain there will be no D-Plant water available for LKNWR
- As a result of no D-Plant deliveries the refuge will not use wells to start filling White Lake. There is simply not enough supply from the wells to maintain White Lake
- Wood River 3,500 acre feet transfer may occur this summer but it is uncertain at this time, this will only provide water to maintain unit 2 through the summer
- There will be very limited spring farming on the California side of LKNWR



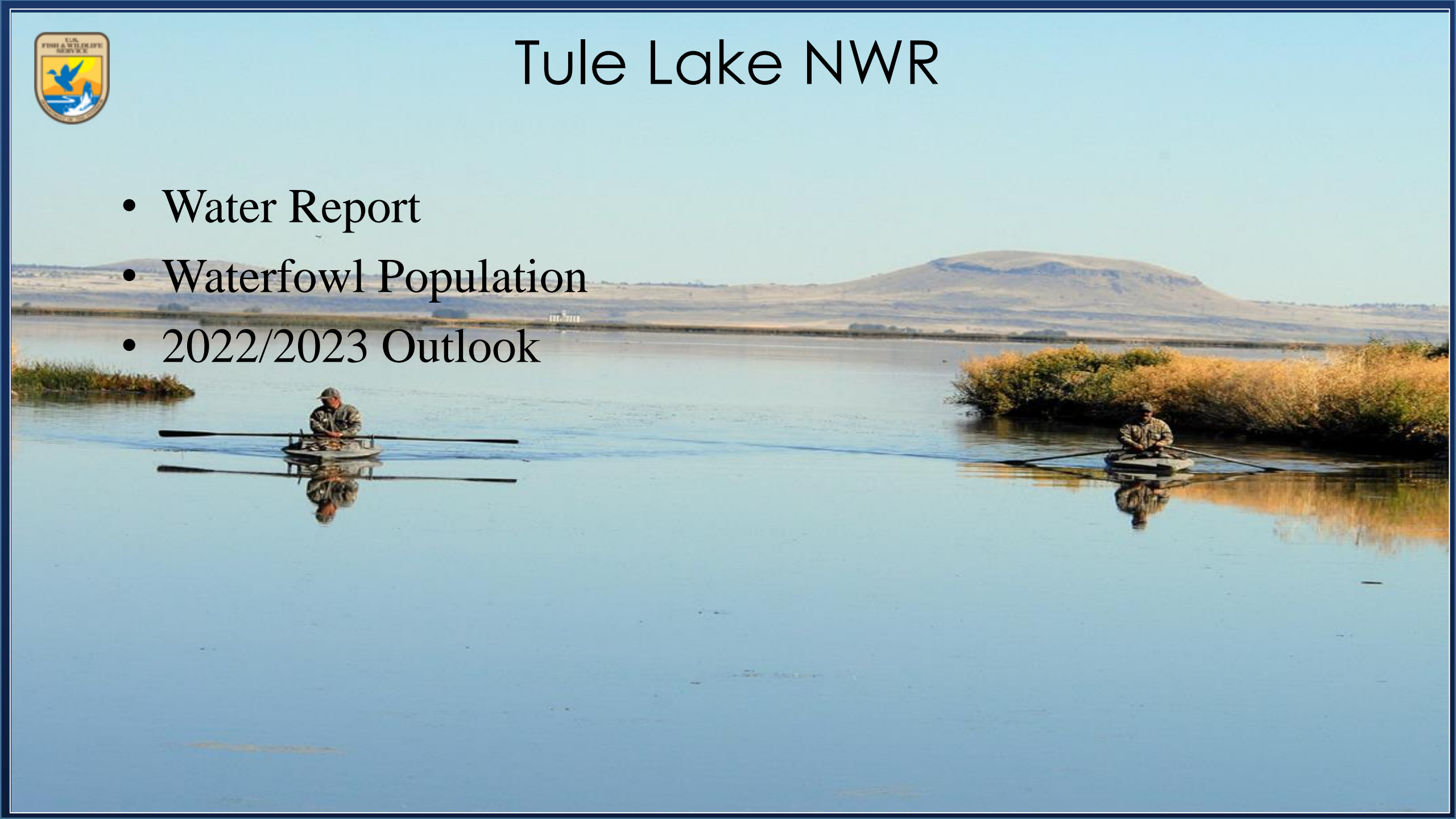
Changes Coming to Lower Klamath

- Some rock islands in 6A that have been navigation hazards will be removed
- Oregon Straits will remain closed to waterfowl hunting after 1pm
- New maps and regulation pamphlets have been developed that comply with new FWS standards.
- Digital, mobile friendly maps will be available for download. They will include location services, which show your location and allow for the collection of GPS points directly onto hunt maps. More information will be posted on refuge web page prior to hunt season.



Tule Lake NWR

- Water Report
- Waterfowl Population
- 2022/2023 Outlook





Background Context

- 1964 Kuchel act dictates how much lease ground can be in specific crops
 - 1/3 can be in row crops when conditions allow (the crop and location of those crops is determined by producers)
- Water on Lease Lands is controlled by TID and BOR, and the FWS collaborates with both parties on timing and delivery of water
- Availability of coop lands for row crop production helps support more flooding throughout the lease lands so integrating row crops into the coop lands increases the availability of early floodable grain
- Currently distribution of row crops dictates when and where flooding can occur (when available) – Under normal water availability subbing of row crops is the biggest factor influencing fall flooding on Tule Lake NWR
- We expect Tule Lake to go dry for the first time in its history. At this time there is no scheduled delivery of water for the protection of Federally Endangered species, wetlands/waterbirds, or irrigation
- Like 2021, drought conditions have forced producers into preventative planting and drought relief programs.
- The USFWS cannot support the irrigation of crops in 2022 on federal lands



Fall Population

- Four aerial surveys were flown fall 2021, inclement weather prevented late winter surveys but we believe the peak of migration was captured
- Peak fall duck population was 42,002 on Nov 3, 2021 (47% lower than 2020)
- Average duck population during the fall migration was 23,609 (63% lower than 2020)
- Peak Goose Population was 21,780 on October 14, 2021 (54% higher than 2020)

**Population estimates only reflect survey days.*

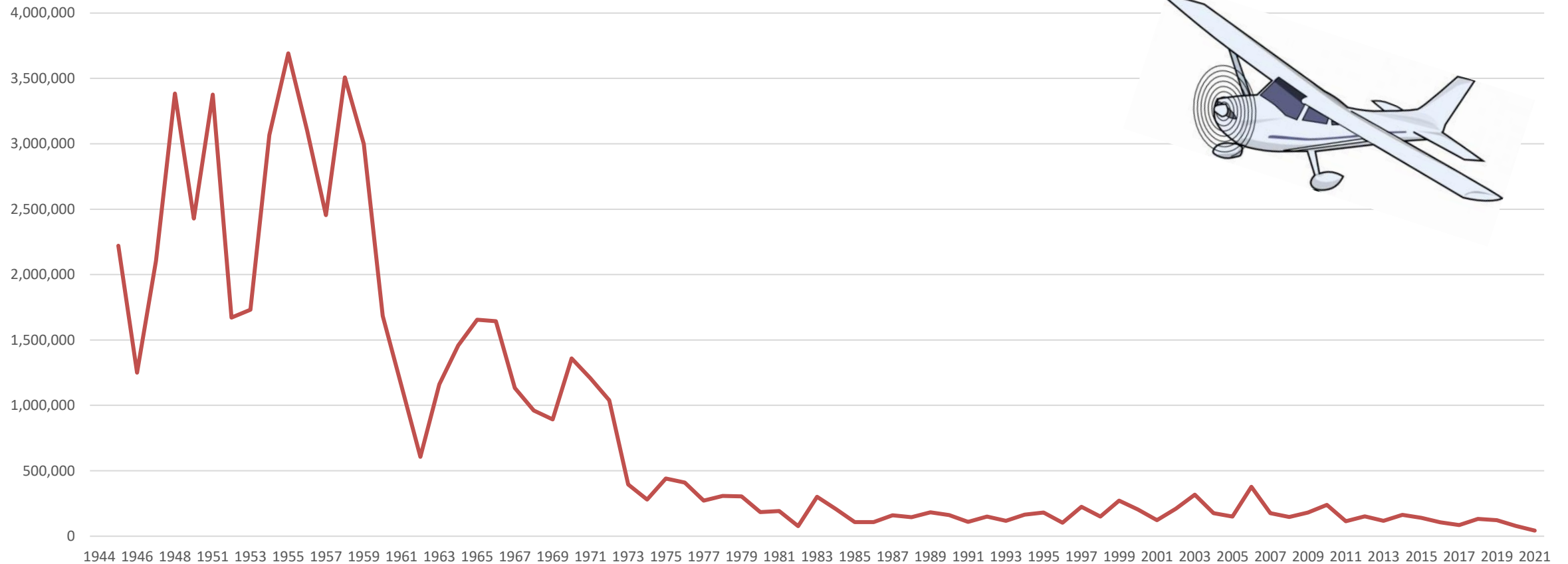
Tule Lake NWR Peak Fall Duck Counts
2000-2021





Long Term Trend of Peak Fall Duck Counts at Tule Lake NWR

Tule Lake NWR Peak Fall Duck Counts
1944-2021





Tule Lake Complex
October 14, 2021
Ducks - 14,875

* Population represents
ducks counted during
flight; actual population
estimate is 2X observed
number

Legend

(birds/ha)

- None
- Low (0.15 - 2.10)
- Medium (2.10 - 4.58)
- High (4.58 - 16.21)

0 1 2 3 4 5 Miles



Tule Lake Complex
October 14, 2021
Dark Geese - 3,444

Legend

(birds/ha)

- None
- Low (0.17 - 0.63)
- Medium (0.63 - 1.52)
- High (1.52 - 6.16)

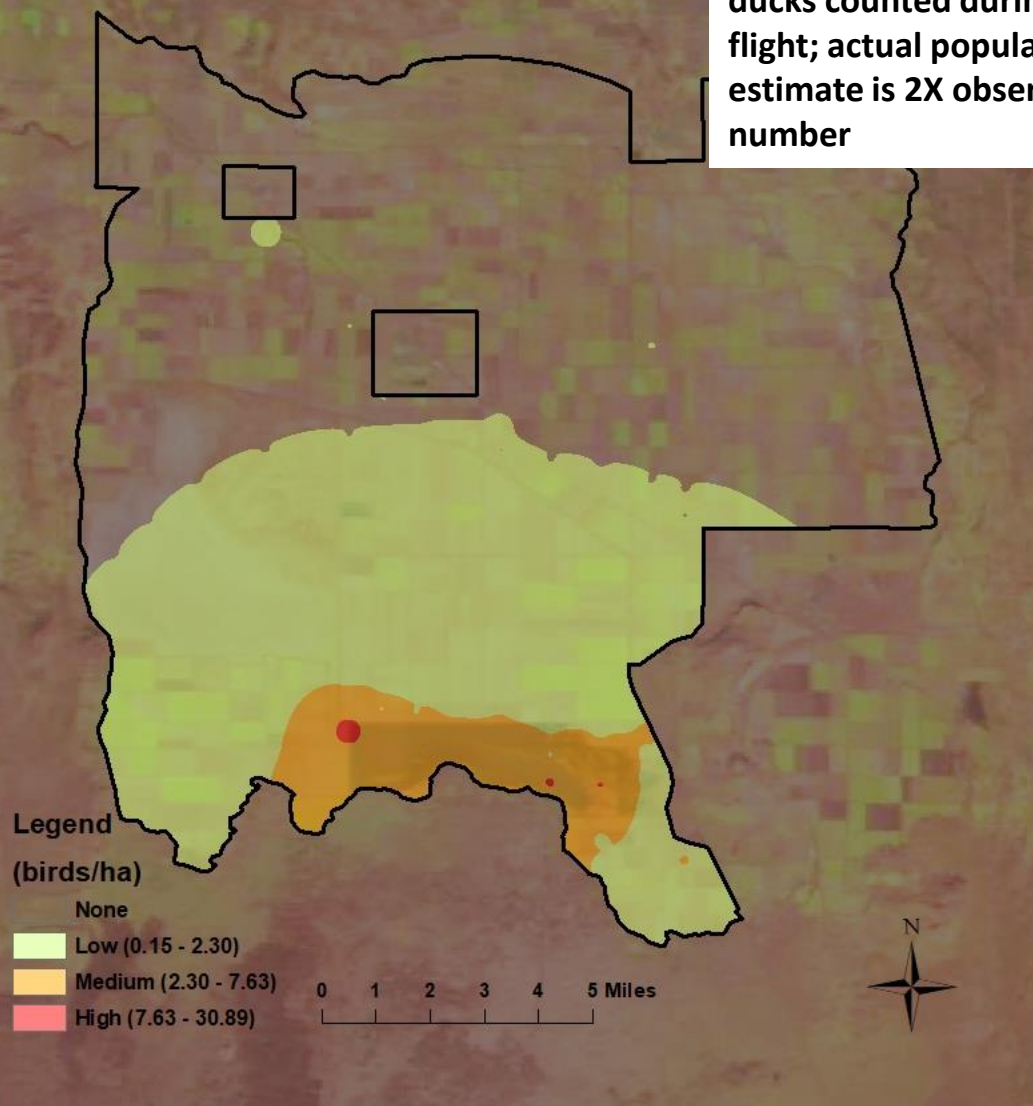
0 1 2 3 4 5 Miles



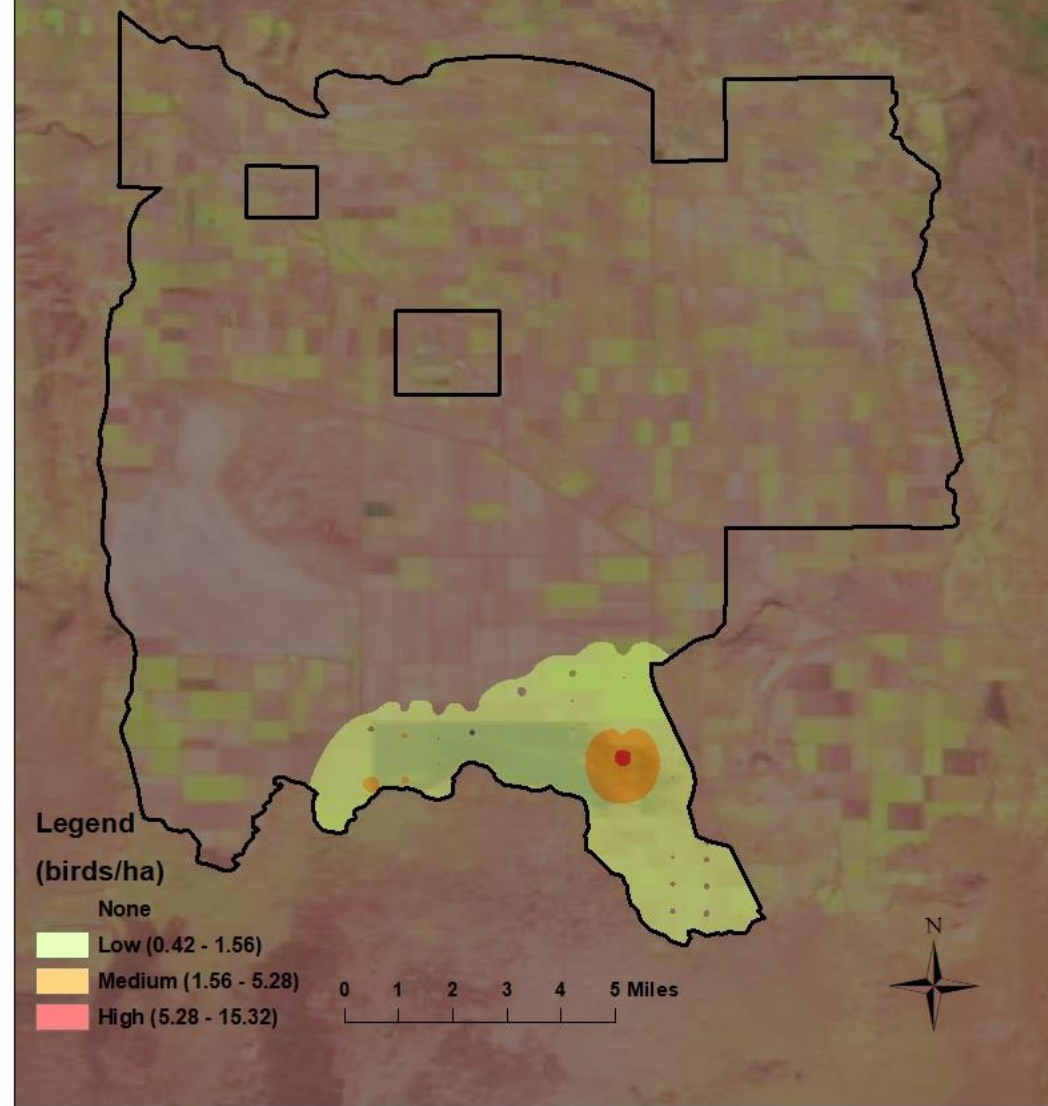


Tule Lake Complex
November 3, 2021
Ducks - 21,002

* Population represents
ducks counted during
flight; actual population
estimate is 2X observed
number



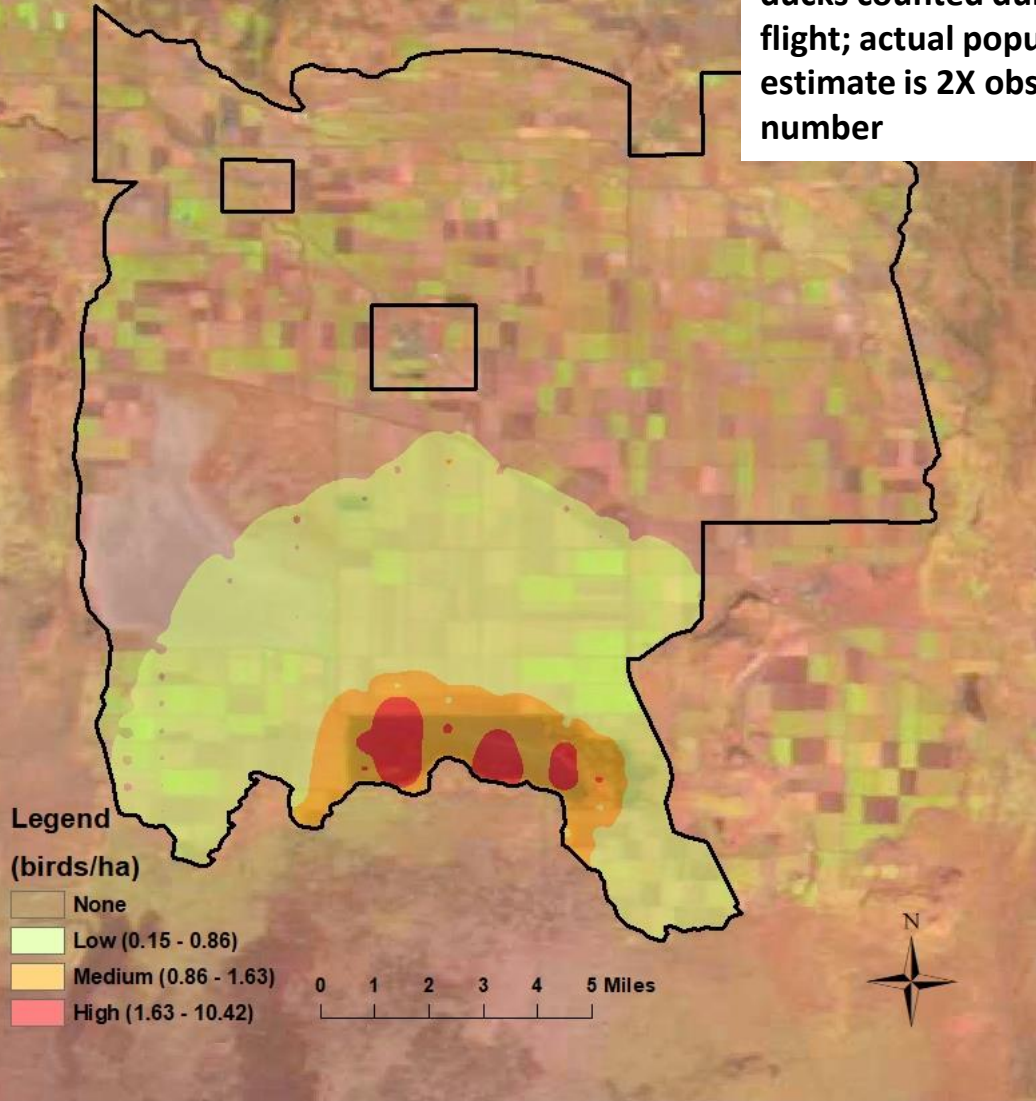
Tule Lake Complex
November 3, 2021
Dark Geese - 5,900



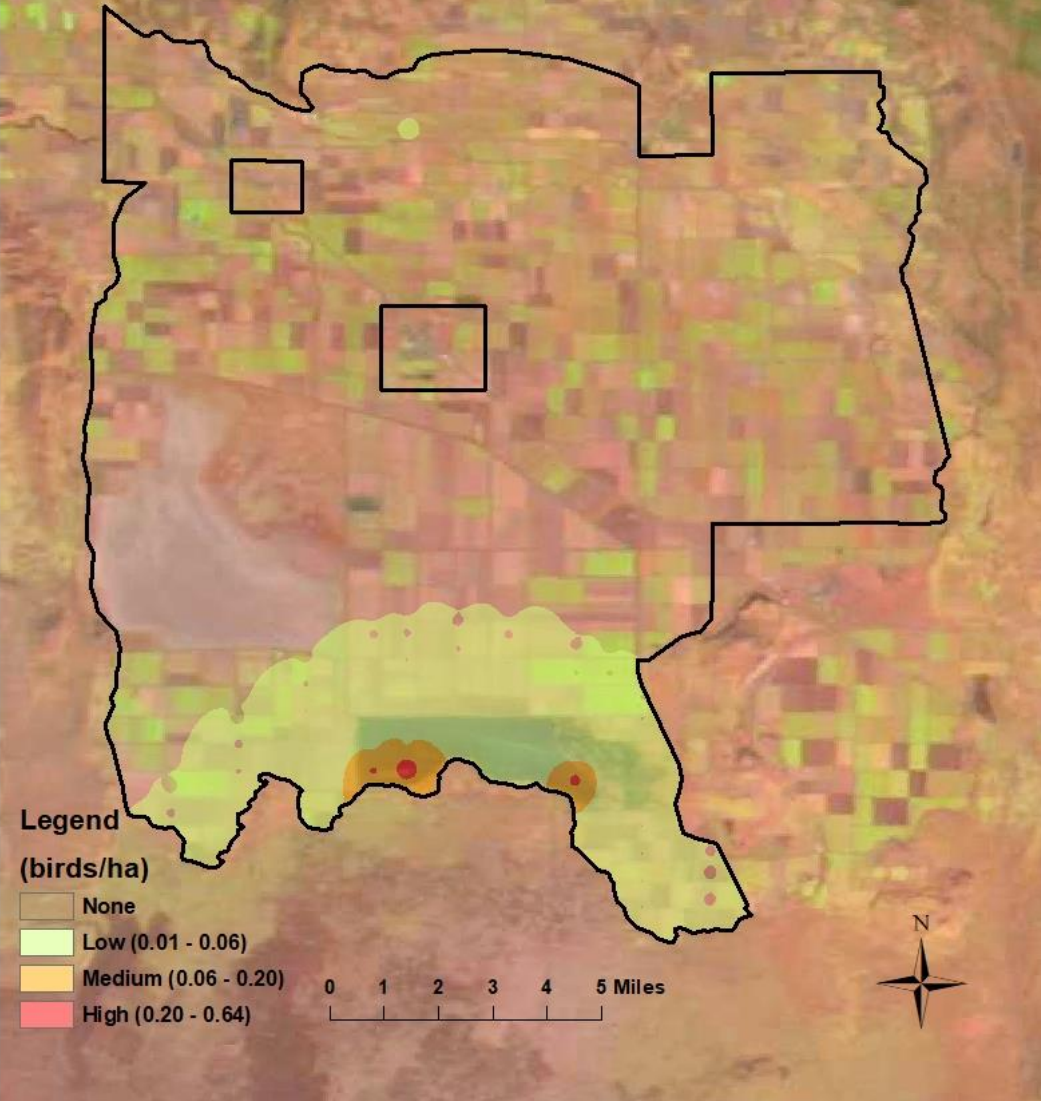


Tule Lake Complex
November 17, 2021
Ducks - 7,343

* Population represents
ducks counted during
flight; actual population
estimate is 2X observed
number



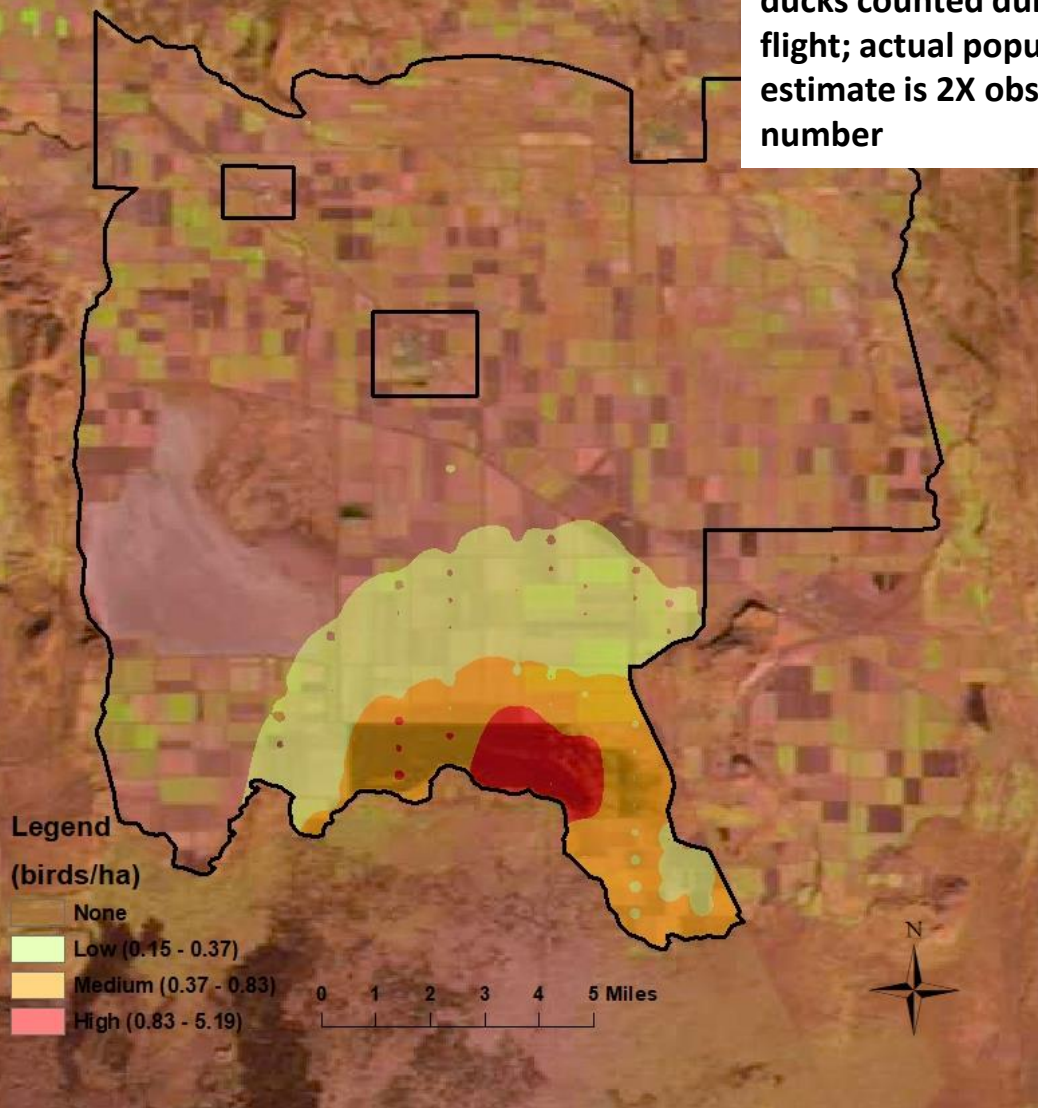
Tule Lake Complex
November 17, 2021
Dark Geese - 388



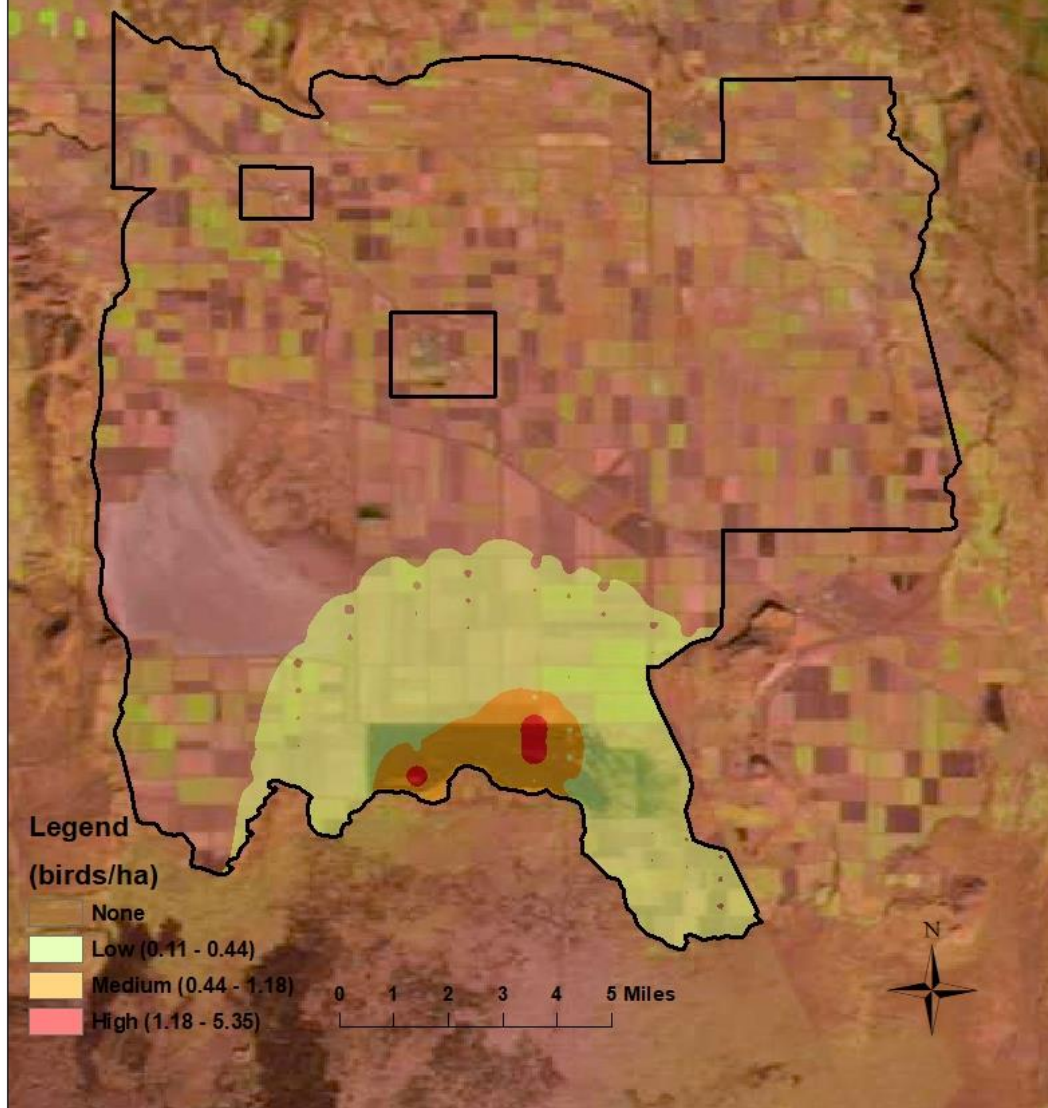


Tule Lake Complex
December 2, 2021
Ducks - 4,004

* Population represents
ducks counted during
flight; actual population
estimate is 2X observed
number



Tule Lake Complex
December 2, 2021
Dark Geese - 2,569





Growing Issues and Concerns

- Both sumps are now experiencing blooms of cyanobacteria, and these have produced dangerous levels of cyanotoxins – This is likely the result of the constant recycling of water and the limited use of D-Plant since the rate increase on electricity and decreased availability of water for needed flushing flows
- We have to look back and understand the drivers of the waterbird populations documented in 50's, 60's and 70's to understand impacts of habitat conditions today. Conditions in Sump 1A were key to both the high populations and the long-term decline in waterbird populations.
- Each of the sumps are productive for waterbirds for about 10 years after a drying event and then they need to be reset. Historically this happened naturally due to climate driven lake expansions and contractions but under the modern system they are stabilized and rapidly age beyond their productive periods.



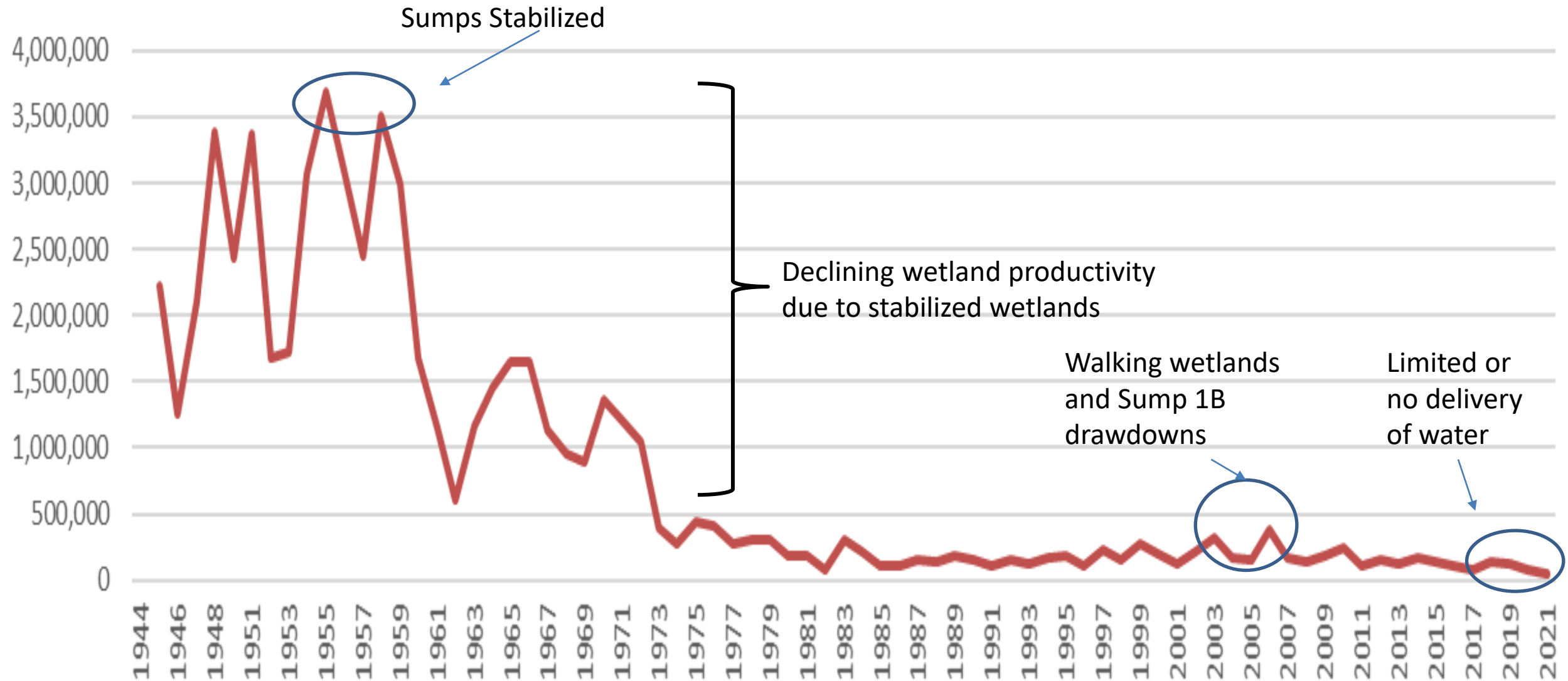
Growing Issues and Concerns Cont.

- Draw downs on 1B have worked but 1B is 66% smaller than 1A so although it can support a lot of birds the potential in 1A is far greater if wetland conditions could be improved
- Drought, climate change, reduced project allocations, and subsequent reduced return flows resulting from increased irrigation efficiency throughout the Klamath Project are driving the water scarcity for the sumps, walking wetlands, and flooded grain in the fall

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Tule Lake NWR Peak Fall Duck Counts 1944-2021





TLNWR 2021 /2022 Summary

- Bird numbers continue to decline at Tule Lake NWR
 - No water availability
 - No flooded grain
 - Disturbance is becoming less of an issue due to low visitation
 - Sump 1A drawdown was successful but we have growing concerns now related to soil health, subsidence, and spread of invasive species and woody encroachment due to the prolonged drought conditions
- Visitation was down significantly



Outlook 2022/2023 Season

- We expect Tule Lake to go dry for the first time in its history as no water will be made available to support 1B during the summer or to refill either 1A or 1B in the fall to provide habitat for migratory waterbirds
- At this time, the refuge does not know how much ground will be planted in cereal grain
- The preventative planting program will likely have high participation this year resulting in many lots with standing grain, however, drought and no irrigation will likely effect stand condition and grain production
- There will be no water available to move through D-Plant to LKNWR
- It is likely there will be no flooding of grain in the fall
- Recreation opportunities and quality of experience are expected to sharply decline this fall/winter



Changes To The 2022 Hunt Season

- The 2022 hunt season will be influenced by water availability
- Water availability is uncertain at this time and management will adjust to the changing conditions. For the most updated information see the Hunter Hotline on our web site.
- If conditions do not greatly improve, hunting will only be allowed in field units and daily lottery will again be cancelled.
- All interior levees in the spaced blind and free roam areas will be closed to all motorized vehicle traffic to reduce the risk of damage to levee infrastructure and disturbance to both resting birds and hunters
- New hunt maps and regulation pamphlets have been developed that comply with new FWS standards. They will be distributed prior to hunt season
- Digital mobile friendly versions of the maps will be available for download. They will include location services, which show your location and allow for the collection of GPS points directly onto hunt maps



Pheasant Hunting

- Pheasant harvest numbers on Lower Klamath and Tule Lake NWR were lower in 2021 than in previous years
- Lower Klamath saw a slightly better harvest than did Tule Lake in 2021, likely due to new hunt boundaries and limited grain production
- Pheasant populations and Nesting success on both Refuges are expected to continue their decline in 2022 due to drought



Photo Credit - <https://www.dpreview.com/galleries>



The Most Common Issues Reported during the Hunt season

- Unrestricted driving in hunt areas
- Increased disturbance from scouting
- Standing grain obstructing hunting
- Sump 1B closure
- Sump 1A not being flooded





Access to Roads And Fields

- Unless posted or otherwise identified on a map, all roads are closed. Do not assume that a road is open because there is no sign
- When you are finished hunting others may not. Please be considerate while entering and exiting fields and wetlands
- To address these concerns, access points will change this year



Increased Disturbance from Scouting

- The likelihood of disturbance increases as habitat availability decreases
- Scouting can disturb feeding and loafing birds. Disturb them and they will leave
- Stay off interior roads and levees, scout from a distance and stay in your vehicle
- Calm relaxed birds will make for a better hunting experience, the next day, and over the course of the season



Preventative Plant Standing Grain

- Preventative planting is an agricultural practice used to control erosion when land is not in full production
- Producers are prohibited from harvesting these fields as part of their agreement with the funding agency
- The number of acres enrolled in this program is variable from year to year, however during periods of limited water availability enrollment increases
- The Refuge is working with producers to increase open areas prior to seed development to support better access and bird use



New Hunt Projects

- The pit blinds at Fry's island have been replanted with native grass cover
- We are working to Salvage old boat-in blinds and plan to install them in Sump 1A to provide additional hunting opportunity these Blinds will be available on a first-come first-serve basis similar to the Lower Klamath pit blinds.



Please Contact us with Questions

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(Cell preferred)