Meeting Notes
Shortnose and Lost River Sucker Recovery Plan
Recovery Team Meeting #3

Klamath Falls Fish and Wildlife Office
U.S. Fish and Wildlife Service
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Klamath Falls, OR
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January 28, 2009
8:00 a.m. to 4:15 p.m.
Topic: Recovery Criteria and Tasks

Recovery Team Members Present: Mark Buettner, Larry Dunsmoor, Chris Keleher, Doug Markle, Graham Matthews, Mark Stern, Scott VanderKooi

Absent: Dennis Lynch

Contractors: Sandra Davis, Don Sada, Dave Sale, Saxon Sharpe

Other: Laurie Sada (USFWS Field Supervisor Klamath Falls FWO), Torrey Tyler (USBR Fishery Biologist)

Welcome and Introductions	Laurie Sada welcomed everyone to the third Recovery Team meeting and thanked everyone for their work and input for the revised Recovery Plan. She told the group that at the time of the October meeting she held the Deputy Field Supervisor position and now she was the Field Supervisor of the Klamath Falls Fish and Wildlife Office.
Tomorrow's RIC meeting	Don Sada provided an overview of the agenda for RIC meeting to be held the following day. At their last meeting, the RIC agreed that they wanted to know more about the science that would support the Recovery Plan. The US Fish and Wildlife Service arranged for the Recovery Team members to stay an extra ½ day and attend the morning portion of the RIC meeting to inform the RIC about the particular aspects of individual members' research. The Recovery Team members were to stand by their research posters for 45 minutes at the beginning of the RIC meeting to informally discuss different aspects of their research with the RIC. Each Team member would then briefly present their poster to the RIC prior to a question and answer period. All agreed that this was a good way for the RIC to meet the Recovery Team members and have the Recovery Team provide their current research to the RIC.
Overview of last Recovery Team meeting	Saxon Sharpe reviewed topics discussed at the last Recovery Team Meeting. She said that after the notes were sent out for review by the Recovery Team and FWO they were posted on the Klamath FWO website. She summarized

and questions	stakeholder concerns shared at the last meeting, noted that the slide presentation on population dynamics (Heppell) was on the FWO website, (http://www.fws.gov/klamathfallsfwo/suckers/suc_rec.htm) and that Eric Janney would be sharing a presentation on sucker demographics to the RIC on January 29. She reminded the Recovery Team that demographics and probability, variance, recovery time frame, recovery units, and possible criteria were discussed at the last meeting.
Demographic recovery criteria discussion	Don told the group that the goal for the Recovery Team meeting today is to discuss language for recovery criteria. This language needs to be sufficiently explicit and justifiable. He then asked Doug Markle and Scott VanderKooi to begin the discussion by sharing their research and thoughts on demographic recovery criteria. Doug began by telling the group that the Recovery Plan for the Oregon chub had very specific recovery criteria: number of fish, number of years, and numbers of populations. The chub reached these numbers and many thought that it should be downlisted. In 2008, however, one population crashed showing that finite numbers, once reached, don't always guarantee the recovery of a species. <u>Population dynamics</u> The Recovery Team agreed that it was necessary to specify a population *growth rate parameter* (lambda, λ). Two aspects will likely be measured and evaluated by future managers. The first is the median value of λ measured over some period of time and the second is the *probability distribution function*, or pdf, (frequency distribution) of those values. We need to better understand sucker frequency distribution (narrow pdf suggests a less-variable population is likely to persist into the future; broad pdf suggests a more variable population, which could get large, but would be more vulnerable to extinction). Questions that should be answered are, "given the median value and pdf that we have seen in the past, is the population stable or increasing (median >1.0) and is it likely to persist into the future (does the pdf suggest some acceptable probability of λ >0?). One Team member suggested that the probability distribution could change over time. Over a 20 year period if λ fluctuation is 0.95 to 1.05, fish are likely to persist whereas if λ fluctuation is 0.5 to 2.5 a much greater probability of the population hitting zero exists. A 2 to 4 year projection is reasonable because the population is highly variable with highly variable recruitment whereas a 20-year time frame is much more difficult to project. Even a healthy population will have increases and decreases. Problems are associated with being very specific and not being specific. It was also mentioned that it is not known what analytical techniques will be available in 10 years, and those will play a role in assessing the demography of suckers.

Demographic recovery criteria discussion (cont.)	The Team doesn't want to constrain future researchers or managers but it wants to see stable populations. Discussion included a suggestion to not specify exact λ values: if population is maintaining λ value of 1 or greater, the population is holding its own or improving. Lambda is independent of magnitude of population, however, if the population is small, each integer change in λ will represent larger number of fish than if population is large. If λ is >1, is a fish recovered? If current populations are ok ($\lambda \geq 1$) will this hold 40 years from now? Lambda must be positive from the starting point and a positive recruitment rate is needed. This will occur over a 4 to 5 year period depending on year class. A comment was that λ can be < 1 but the population may be considered "stable" because the population doesn't reach zero. Another comment was that a single λ value doesn't tell you anything because the population has an equal chance of increasing or decreasing. A suggestion concerning this statement was to use a time frame, such as a certain number of years, or use a mean annual λ value. <u>Setting a time frame</u> Don asked the Team what the age distribution should be in terms of long-term population viability? What is the effective population size and how can this be determined because the population is difficult to measure? River and lake (springs) spawners should probably be separate parameters and tied to geographic area. Should population size be determined by count or genetics? Need a "reasonably diverse, not inbred" population. It was noted that genetic diversity plummets after fish kills. Need to monitor for recruitment and survival. One possibility is to use a generational time frame, not number of years. Must justify the number of generations, however. This may work because the probability distribution of one generation is known. Recruitment events are not necessarily generational, although they can be on different scales, such as a decadal scale. What is the length of time between past catastrophic events? A catastrophic loss could trigger a re-set button for λ. One suggestion was to state a minimum viable population number until certain threats were ameliorated. Often 500 is determined to be a minimum population size. But one can't specify something that is impractical to measure. The question was asked, "if 4,000-6,000 fish are detected, is that stable"? It depends on what the survival is. If a consistent population number occurs over some length of time, then survival is good enough. Problems measuring the population are numerous. Lake-wide population estimates are impossible. Spring and river populations are heavily monitored, however, so the ratio of tagged to untagged fish and numbers at weirs could be obtained. These values have a lower end of certainty. These numbers could be used to determine the age of individuals and recruitment. Conversely, numbers

Demographic recovery criteria discussion (cont.)	based on the unmarked (untagged) population are not based on random sampling so one assumes that the marked population is equal to whole population. Ten years of spawning run data exist. The best data are from the springs in UKL because of the high capture rate of springs investigated. The capture probability is very different from year to year in the Williamson River. One can calculate the capture probability and can get population parameters by using remote detection systems. Can also get trend data that are reliable. Should monitor spawning population length frequency/age class distribution to evaluate recruitment success. It was suggested to use some sort of index approach, such as a methodology that functions well across a wide range of hydrology. It was suggested that a test unit approach might work. The index parameter must be consistently implementable. For example, length frequency data is a surrogate for age diversity data. <u>Population/recovery units</u> The identification of recovery units is not required in the Recovery Plan however their designation would be helpful to manage for recovery. It was agreed that the UKL population was important for recovery. Recovery units, if designated, should be identified, mapped, and justified. The Plan needs to explain why some units are not good for recovery and state if insufficient information exists to determine a recovery unit. Uncertainty in each recovery unit needs to be addressed. Critical habitat units must reflect recovery units. Population redundancy supports resilience. Should some populations be given up? Which ones? The criteria are the same for all populations. Some are closer to recovery than others. Clear and Gerber could be included if subsequent work indicates that. Gerber is under study as part of larger study. Depending on results of study, it could be included as Recovery Unit. It may be necessary to acknowledge the uncertainly of Gerber in the Recovery Plan and make its inclusion as a Recovery Unit contingent upon more information. Need to know run timing and ecological separation and how it works (e.g., different spawning areas) in Clear Lake to determine if there are different biological populations. Clear Lake was once a natural system. Do we need populations in Clear and Gerber to sustain populations? Can these areas be managed to assist populations? Clear Lake and Gerber suckers are part of a hybrid swarm so these populations are morphologically indistinct. A diverse ecosystem helps species/subspecies separate genetically and morphologically. Poor ecological conditions can lead to more species hybridization. Maybe these populations have been hybridizing and separating for thousands of years. We do not know. How are these populations contributing to non-extinction? Is this a form of diversity? Do we need these units for redundancy? Could fish in impoundments above Clear Lake be seed source for re-population? Genetic differences and localities are mixed for shortnose in different units. The shortnose sucker population in

Demographic recovery criteria discussion (cont.)	Upper Klamath Lake is more vulnerable than Lost River. Do we need separate extinction criteria for shortnose sucker? Refugial populations may be needed to guard against extinction. Refuge populations could extend the current range. Should refugial populations be established, for example, at Willow Valley reservoir? Refugial populations can be added to the Recovery Plan if populations decrease substantially; they can be added as a potential future need. Current "refugial populations" will be removed if dams are removed on the Klamath River (Copco, Iron Gate, J.C. Boyle). Should a hatchery be established? Should extinct populations be re-established? It might be possible to get spawning populations reestablished in Wood River Valley streams and springs and streams near Pelican Bay in UKL. The 2008 Bureau of Reclamation biological opinion argues Tule Lake is important for non-extinction (part of historic range). Klamath River reservoirs are outside the historic range, however. It was suggested to reestablish populations where they were found historically before establishing refugial populations. Triggers (thresholds) for: (1) establishing refuge populations and (2) using hatcheries to assist with recovery could be established.
Threat based criteria discussion	The Recovery Plan should combine demographic statistics and threats. Recovery goals must be accomplished by reducing threats. Demographic criteria can then be used to measure recovery success. Laurie discussed a threats based criteria draft recovery plan for the Desert Tortoise (to view the draft plan go to http://www.fws.gov/nevada/desert_tortoise/documents/recovery_plan/DraftRevRP_Mojave_Desert_Tortoise.pdf and see section C. RECOVERY GOAL, OBJECTIVES, AND CRITERIA beginning on page 56). She noted that this plan also uses λ (lambda) rate of population change as a demographic criteria thus confirming the direction of the Sucker Recovery Team conclusions for measuring population demographics. It was agreed that greater spawning distribution in UKL and the Sprague and Williamson rivers, and more in-lake spawning (which may require manipulation e.g., egg boxes) was needed to remove a demographic threat. Different spawning groups exist in UKL. For example, Lost River suckers spawn at several springs on the east side of UKL. Consideration should be given to designating where the spawning localities should exist (Wood River system), or possibly designate some number of spawning sites or some number of larvae from different sites. Having spawning groups at numerous spawning sites are important because different sites will experience different ecological conditions and, therefore, mortality. Viable spawning groups should be established at springs/tributaries on the west side of UKL and Wood River Valley. The Sprague River watershed has more localities for spawning.

Threat based criteria discussion	Therefore, for the UKL unit consideration should be given whether to designate the whole lake or just parts of lake for criteria. Wording suggestions were made to "maintain existing spawning areas and add (some number more?)" "maintain well-distributed populations throughout each recovery unit", "provide for redundant and resilient populations", "establish distribution criteria of spawning groups". It was stated that threats will be abated if certain actions are taken that result in meeting demographic criteria. <u>Habitat quality recovery criteria</u> Water quality is a habitat reduction issue. Progress toward meeting the demographic criteria can be made by minimizing the water quality threat (dissolved oxygen, water temperature, and meet TMDL standards for lake). It was noted that fish move to Pelican Bay when water quality gets bad in the main part of UKL. Habitat quality also includes protecting habitat from wetland loss, dams, and water quality. To protect and manage habitat (1) remove fish barriers, and (2) reduce lake level fluctuations. Some recovery tasks are also needed for disease and predation threats. These could be included under habitat.
Criteria Language	The Recovery Team offered these suggestions for consideration: Major issues to include in the Recovery Plan (1) sample error, (2) λ definition, (3) time frame to determine if population will persist. Should also mention genetic diversity, alternatives, potential extinction. Demographic Criteria wording could include: 1. The demography exhibits characteristics of a stable or growing population that is resilient to stochastic events based upon: • Mark recapture studies show population is reaching XX level. • Survival and recruitment over an average adult lifespan (must explain the reasoning behind choosing average adult life span) • Diverse age structure (juvenile, sub-adult, adult) sex ratio, year class strength. 2. Distribution of spawning groups throughout each Recovery Unit. 3. Positive population growth rate and large or growing population that is resilient. If this wording were used, some level of abundance (derived number) for recovery characterized by Lost River sucker in 2008 would be needed. Lost River suckers currently have higher and less-variable survival rates than shortnose suckers. If Recovery Units are used, the difference between recovery units for each species should be justified and explained because both morphology and ecology show distinct species. Acknowledge uncertainty regarding these units. How do management and ecological variables foster

Criteria Language	coming together of species? For example: λ as measured by (*some methodology*) over (*some amount of*) time, the population is stable or growing. This could be indicated by mark recapture studies showing annual recruitment for the population to persist over 2 generations. Wording could include establishing new and maintaining existing spawning groups. For example, a spawning group along the west side of Klamath Lake (such as historic sites in the Pelican Bay area), in the Wood River valley and in the Sprague River valley. There is a good habitat protection statement in the Desert Tortoise Recovery Plan. The proposed two-generation time period should encompass at least 1 catastrophic event. Spawning success is covered under diverse age structure wording. Recovery Team recommendations on what alternatives exist to prevent extinction if the population crashes need to be included (a hatchery program?). Need to address ecological parameters of lake and river spawning populations. To Delist/Downlist: 1. Demographic parameters 2. Threat reduction or elimination parameters 3. Other vulnerabilities or biologic parameters Possible time frames could be down-listed from endangered to threatened: 1 generation; threatened to delisted: 1 generation (total of 2 generations from endangered to delisted). The population(s) should be resilient to the catastrophic events (natural or not) that we know it faces. Average adult lifespan must be considered. The average adult lifespan for shortnose is 14 years (1 generation). Mark and recapture methods should be laid out in the narrative. This should be stated as the present technique. Spend time explaining and justifying why 2 generations are used for the time frame for recovery (long life span and age to maturity). Define stochastic event frequency (magnitude and likelihood to occur) how many are likely to occur per lifespan. <u>Shortnose</u> The **UKL shortnose** sucker will be considered for reclassification from endangered to threatened when it is demonstrated that: 1. The demography exhibits characteristics of a growing population that is **resilient** to stochastic events based upon: • Survival and recruitment over an average adult lifespan (1 generation) • Diverse age structure (*from juvenile to adult*) 2. If population increases are rapid (for example λ=1.5) a shorter timeframe may be considered The **UKL shortnose** sucker will be considered for reclassification from

Criteria Language	threatened to delisted when it is demonstrated that: 1. The demography exhibits characteristics of a growing population that is **resilient** to stochastic events based upon: • Rapid population growth over an average adult lifespan or positive growth over two adult lifespans (2 generations) • Diverse age structure (*from juvenile to adult*) The **Clear Lake shortnose** sucker will be considered for reclassification from endangered to threatened when throughout its historic range it is demonstrated that: 1. The demography exhibits characteristics of a population that is **resilient** to stochastic events based upon: • Survival and recruitment over an average adult lifespan • Diverse age structure (*from juvenile to adult*) 2. If population increases are rapid (for example λ=1.5) a shorter timeframe may be considered The **Clear Lake shortnose** sucker will be considered for reclassification from threatened to delisted when it is demonstrated that: 1. The demography exhibits characteristics of a growing population that is resilient to stochastic events based upon: • Rapid population growth over an average adult lifespan or positive growth over two adult lifespans • Diverse age structure (*from juvenile to adult*) <u>Lost River</u> For river and lake populations (both are needed to encompass ecological diversity) of Lost River, if the number marked fish detected in one year is > ??? and λ > 1 over an average of 20 years (1 generation or average lifespan) given that the population size is based on the number of tagged fish detected each year, with a survival of 90%, mortality and recruitment are stable. The **UKL Lost River** sucker will be considered for reclassification from endangered to threatened when it is demonstrated that: 1. The demography for both shoreline and river populations exhibits characteristics of a stable or growing population that is **resilient** to stochastic events based upon: • Survival and recruitment over an average adult lifespan (1 generation) • Diverse age structure (*from juvenile to adult*) 2. If population increases are rapid (for example λ=1.5) a shorter timeframe may be considered Maintain existing spawning areas and increase distribution of spawning groups to occupy other areas. Such as at least 1 spawning group in Pelican Bay and Wood River Valley.

Criteria Language	
Begin Recovery Tasks discussion	Did not have time to discuss.
Other topics	Action Items to complete before next meeting: Don • write up recovery criteria, threats, justification, tasks and send to Recovery Team. Provide time for everyone to review the written documents. • define and justify boundaries of UKL recovery unit • draft and explain terms • draft a list of recovery tasks.
Schedule next meeting and adjourn	**Next meeting will be either July 7 or 8, 2009.** Please hold both of these dates open. Meeting adjourned at 4:15 p.m.