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11-028

Inquiry Submittal

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a. **Title:** Spawning areas of green sturgeon *Acipenser medirostris* in the upper Sacramento River

Applicant: U.S. Fish and Wildlife Service, Northern Central Valley Fish and Wildlife Office, Red Bluff, California. Phone (916)527-3043 FAX (916)529-0292. E-mail Jim_Smith @ mail.fws.gov. Principal investigators, Kurt Brown.

b. **Project Description:** The goal of this project is to determine spawning areas of green sturgeon in the upper Sacramento River. The project involves the use of an artificial substrate system (California Fish and Game 1990) in the river at various locations: 1) immediately below Red Bluff Diversion Dam (RBDD) River Mile (RM) 243, and 2) between RBDD and the Anderson Cottonwood Irrigation Diversion (ACID) RM 298.5. The project will evaluate actions pertaining to stressors affecting one of the priority species (green sturgeon). The stressors are temperature, migration barriers, and reduction of gravel recruitment. The primary biological objectives are to: 1) to identify green sturgeon spawning sites and when spawning occurs, 2) evaluate the availability and use of specific sites, and 3) establish baseline habitat needs such as; substrate type, velocity, temperature, and depth. These objective will be approached with a multi-year study program

The primary benefit this project will provide are specific areas of the upper Sacramento River utilized for green sturgeon production. The level of availability and use of these areas will provide as an indicator of condition of the habitat and its' use for future production of green sturgeon. Little is known about the life history of green sturgeon in the Sacramento River. This project will greatly increase our knowledge of their life history.

c. **Approach:** Spawning areas will be determined by placing two or more artificial substrate mats in about a dozen locations between RBDD and ACID. In addition several would be placed immediately below RBDD. Periodic examination of the substrate mats will determine if spawning is taking place in the vicinity. Sturgeon eggs readily adhere to the mats and typically drift for a distance (at least 1/4 mile) before settling to the bottom where they adhere to substrate (Dave Kohlhorst, CDFG Stockton, personal communication). Use of specific sites will be evaluated based on presence or absence of eggs on the mats. Environmental data will be noted for study each location. Location of spawning areas will be the focus during the first study year. Second year studies would focus effort on those known spawning areas.

Tasks: Funding of this project would provide for fabrication of the mats, placing the mats in specific locations in the upper Sacramento River and periodic retrieval examining mats for eggs. Some mats may be borrowed from California Department of Fish and Game (CDFG) in Stockton. Additional mats may be built to replace those lost due to high flows.

Schedule: The first year field activities would begin mid-April and end in mid-July during the spawning period. Mats would be retrieved and examined 1-2 times weekly. Results for the first year field activities will be available in a progress report at the end of the season.

d. **Justification for Project Funding by CALFED:** Observations of adult green sturgeon at RBDD after dam gates are lowered in the spring suggest spawning takes place in the vicinity. Numerous sitings of adult green sturgeon have been noted in a 10-mile stretch below RBDD (Moyle, P.B., R.M. Yoshiyama, J.E. Williams, E.D. Wikramanayake. 1995). Additionally, over a two-year period, eight "yearling" size green sturgeon were collected upstream from RBDD in October of 1990 and 1991 (Kurt Brown, U.S. Fish and Wildlife Service, Red Bluff, CA,

personal communication). This finding allowed the assumption that spawning occurred upstream of RBDD. This has been confirmed in the last three years with the capture of sturgeon larvae the rotary-screw traps at RBDD. One percent of the total number of fish captured in the rotary-screw traps from 1 July 1994 to 30 June 1995 were green sturgeon (Johnson, R.R. and C.D. Martin. 1997). More than 1,300 sturgeon larvae were captured in 1995 and 410 in 1996. More sturgeon are being captured this year ($N= 351$ as of July at RBDD). Samples of these larvae were raised in laboratory conditions at University of California at Davis by sturgeon researcher, Patrick Foley and confirmed as green sturgeon. Green sturgeon are identified as a species of special concern by CDFG and a species of concern by the U.S. Fish and Wildlife Service (Service). Current operations at RBDD allow adult green sturgeon to migrate past Red Bluff and successfully spawn upstream. Documenting spawning of green sturgeon above RBDD not only extends the previously known range, it provides opportunity to apply programs for restoration of the species. The project is consistent with other ecosystem restoration programs such as: Central Valley Project Improvement Act (CVPIA), Red Bluff Diversion Dam CVPIA (3406 [b] 1C) actions and planning process, Anadromous Fisheries Restoration Program (AFRP), and Red Bluff Research Pumping Plant Evaluations.

e. Budget Costs: Project costs for the first year field activities include fabrication of the mats and salaries. Costs from mid-April to mid-July FY '98 are \$44,000. Costs for subsequent years are \$39,000, which includes fabrication for replacement mats and salaries. Costs assume the use of existing vehicles and boat. This project would be multi-year and would continue until spawning areas are located.

Third Party Impacts : No third party impacts will occur during the project.

f. Applicant Qualifications: The Northern Central Valley Fish and Wildlife Office (NCVFWO) was established in 1978 as part of the Service's responsibility to facilitate restoration of Pacific salmonids. The construction and operation of dams and water diversion projects and the subsequent degradation and loss of habitat have been the primary contributors to the decline in all anadromous salmonid stocks in the upper Sacramento River. Specific goals of the NCVFWO are to: 1) Stabilize or increase the runs of anadromous salmonids in the Sacramento River system, 2) Improve the effectiveness of federal fish propagation facilities in California, 3) Protect and restore the productivity of natural habitats in the Sacramento River system, and 4) Continue development of information and strategies for protecting the natural habitats of the Sacramento River system as migration routes, spawning areas, and nursery areas for anadromous salmonids. Since the enactment of the CVPIA the NCVFWO has participated in a number of technical teams to develop the Anadromous Fisheries Restoration Plan (AFRP). Our office participated on the sturgeon technical team comprised of individuals from state and federal agencies and universities that developed a list of restoration needs for white and green sturgeon.

g. Monitoring and Data Evaluation: Data from this project will identify specific areas utilized for spawning and early life history information. These areas and their subsequent monitoring will coordinate with other existing sturgeon restoration programs. Peer review of reports will occur within the Service, CDFG, and members of the sturgeon technical team.

h. Local Support/Coordination with other Programs/ Compatibility with CALFED

Objectives: The project will be coordinated with sampling at RBDD, and meeting AFRP goals. This project is consistent with current restoration planning efforts identified in: Central Valley Project Improvement Act - Plan of Action for the Central Valley Anadromous Fish Restoration Program, and Working Paper on restoration needs: habitat restoration actions to double natural production of anadromous fish in the Central Valley of California. Volume 1,2,and 3.

References

- California Dept. of Fish and Game. 1990. Use of an Artificial Substrate To Collect White Sturgeon Eggs. California Fish and Game 76(4):248-250.
- Moyle,P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake. 1995. Fish Species of Special Concern In California. Department of Wildlife & Fisheries Biology. University of California, Davis.
- Johnson,R.R., and C.D. Martin. 1997. Abundance and seasonal, spatial and diel distribution patterns of juvenile salmonids passing the Red Bluff Diversion Dam, Sacramento River, July 1994 - June 1995. Red Bluff Research Pumping Plant Report Series, Volume 2. U.S. Fish and Wildlife Service, Red Bluff, CA.