

Pre-Proposal for Section 6 Traditional Funding Federal FY 2015

*All funding begins October 1, 2015 and ends September 30, 2016
Purchasing and invoicing procedures must fit in the FY accounting timelines.*

Due March 2, 2015

Project Title: Habitat Use, Movement, and Survival of Juvenile and Sub-Adult Gulf of Mexico Sturgeon (<i>Acipenser oxyrinchus desotoi</i>) from the Pensacola Bay Watershed, Florida	Estimated Cost: \$ <u>72,035.00</u>
FWC Requestor (Individual or Contact Person for Team): Name: <u>John R. Knight</u> Email: <u>john.knight@myfwc.com</u> Phone numbers office: <u>850-957-0005</u> cell: <u>850-393-1174</u>	Total Rating Score: <i>(please see 2nd page)</i> <u>13</u>
Alternate Contact Person(s) (optional): Name: <u>Jason Dotson</u> Email: <u>jason.dotson@myfwc.com</u> Phone Numbers for Alternate: 352-415-6969	
Partners Involved (include affiliation): Adam Kaeser (Gulf Sturgeon Lead Panama City Florida). U.S. Fish and Wildlife Service	
Target Species: Gulf of Mexico Sturgeon (<i>Acipenser oxyrinchus desotoi</i>)	
Project Start and End Dates (MM/DD/YYYY): 10/01/2015 through 09/30/2018	
Are you submitting this project to another funding source? ☒ YES or NO If "yes," please list funding sources: _____	
Describe the specific need this project will address: In 1991 the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) jointly officially listed the Gulf of Mexico Sturgeon (<i>Acipenser oxyrinchus desotoi</i>), as a threatened species under the Endangered Species Act (Federal Register 56 FR 49653). A Gulf Sturgeon Management/Recovery Plan was published in 1995 identifying factors contributing to decline, impediments to recovery, and research actions needed to address threats. The long term objective of this plan would be considered achieved when Gulf Sturgeon population are considered self-sustaining. A self-sustaining population was defined as "one in which the average rate of natural recruitment is at least equal to the average mortality rate in a 12-year period" (FWS and GSMFC 1995). While there has been extensive work conducted on adult Gulf Sturgeon populations, research dedicated toward juvenile and sub-adult Gulf Sturgeon populations is lacking. Gulf Sturgeon population dynamics in Florida are not well understood. Populations in the Suwannee River appear to be stable, although Pine et al. (2001) indicated that a slight increase in annual mortality (from 16 to 20%) could result in a population decline. Population dynamics of Gulf Sturgeon in the western part of its range in Florida are currently not well known, and populations from the Pensacola Bay system may actually be declining (FWS and NMFS2009). FWS has annually monitored Gulf Sturgeon populations from one of four Florida panhandle rivers (Escambia, Yellow, Choctawhatchee, and Apalachicola) since 2003 (FWS and NMFS2009) and estimates, indicate that populations from the Pensacola Bay River systems each have populations of less than 1,000 individuals (FWS and NMFS 2009). None of these studies included juvenile Gulf Sturgeon in abundance estimate due to difficulties associated with collecting small individuals. Therefore, there is a need to determine the most effective techniques to collect juvenile Gulf Sturgeon. Specifically, research is needed to identify gears that are effective at capturing age-0 Gulf Sturgeon. Sulak and Clugston (1998 and 1999) reported on various aspects of early life history and capture techniques for juvenile Gulf Sturgeon (age-1 to age-3) from the Suwannee River but it is unknown whether results from these studies are transferrable to other watersheds. Furthermore, Sulak and Clugston (1998) were not able to sufficiently collect age-0 fish (N = 34; 1989-1996). Gears such as trawls or trammel nets used in research on other sturgeon species may help direct research in Florida Gulf Sturgeon populations (Kempinger 1996 and Herzog et. al 2005 Wanner et. al 2012). Techniques developed for this project will be applicable to other Gulf Sturgeon populations throughout its range. Gulf Sturgeon populations are particularly sensitive to variation in juvenile abundance (Pine et al. 2001), and juvenile abundance may be limited due to several anthropogenic factors. The prevailing assumption is that habitat reduction and degradation, due to construction of impoundments, point source and non-point source impacts, and dredging for navigation	

purposes, are likely significant contributing factors limiting recovery of the species (FWS and GSMFC 1995). Juvenile Gulf Sturgeon spend the majority of their early life in freshwater habitats, so they are likely exposed to most of the habitat threats faced by the species (FWS and NMFS 2009). Therefore juvenile habitat preference needs to be characterized, along with utilization/selection and movement of juveniles within freshwater habitats to understand whether juveniles are impacted by the identified threats.

There is also a need to characterize juvenile (age-0 to age-3), and sub-adult (age-4 to age-5) annual survival rate which may be critical to understanding factors preventing recovery of the species (FWS 2009). Rudd et al. (2014) determined natural mortality (the inverse of survival) for adult Gulf Sturgeon (> 1350 mm total length). A similar modeling approach may be useful to determine survival of juvenile and sub-adult Gulf Sturgeon if collections of a sufficient sample size of juvenile fish can be achieved.

Without this critical information on juvenile Gulf Sturgeon populations dynamics it will be difficult to achieve the long term goal identified in the 1995 recovery. Specifically, early life history survival is needed to eventually be able to determine recruitment. Juvenile habitat selection is also needed to determine if in-stream habitat availability is a key factor limiting recovery of the population. Once juvenile habitat selection is identified, this information can be used to determine if suitable habitat is available to sustain a sufficient rate of natural recruitment to achieve the long term goal established by the Gulf Sturgeon Management /Recovery Plan. If suitable habitat is determined to not be sufficient to sustain populations then natural resource managers have the appropriate research needed to guide future habitat restoration activities.

Project Objectives (*should be measurable*):

- 1) Develop sampling techniques to collect YOY (age-0) Gulf Sturgeon
- 2) Characterize juvenile fine scale movements, seasonal habitat use, and habitat selection of juvenile and sub-adult Gulf Sturgeon (age-0 to age-5) from the Pensacola Bay system.
- 3) Estimate survival of juvenile Gulf Sturgeon from the Pensacola Bay System

Project Approaches and Methods:

The first year of this study will primarily focus on a gear evaluation study to determine what sampling techniques are appropriate to collect YOY, juvenile, and sub-adult Gulf Sturgeon. Both active and passive gears will be evaluated. Sampling will be conducted in fall months since it is presumed that juvenile sturgeon will have recruited to the sampling gear by that point. Juvenile and sub-adult sturgeon collected will be internally implanted with acoustic telemetry tags (Vemco model V7 and V9) and they are encountered.

Tracking will include both active and passive techniques. Manual tracking will be conducted to determine seasonal habitat use. Two types of passive techniques will be conducted. Fixed station receivers (Vemco VR-2w) will be deployed in the river proper during the spring, summer and fall seasons to monitor long term movements. Mobile arrays will also be deployed when tagged fish are manually re-located to determine daily movement. Habitat selection will be determined *ad hoc* by collecting habitat availability. To determine scale effects on habitat selection a two-tiered approach will be implemented. Habitat availability data will be collected “in-stream” at similar flow conditions at randomly selected locations. These locations will be plotted in ARCGIS onto a habitat mosaic that will be created using a side scan sonar (Hummingbird 1197C). Additional landscape features will be evaluated and modeled to determine habitat selection if deemed appropriate. Winter habitat use will be determined by re-deploying the fixed station receivers in the vicinity of the river mouth, where it is presumed that juvenile Gulf Sturgeon reside during the winter months.

Subsequent years will focus on tagging juvenile and sub-adult Gulf Sturgeon. Simulations will be conducted to determine the appropriate sample size needed to characterize juvenile and sub-adult survival. The appropriate methods to determine survival will be evaluated based on sample size of Gulf Sturgeon collected. Habitat use (and availability) data collection will continue into subsequent years. Juvenile survival will be determined based on age-0 to age-3 fish. Sub-adult survival (age-4 and age-5) will be determined if a sufficient sample size is collected.

Project Benefits, including deliverables:

Provide needed population demographic information for juvenile Gulf Sturgeon to address actions identified in the 1995 Gulf Sturgeon Recovery/Management Plan and the 2009 Gulf Sturgeon 5-Year Status Review.

Budget Details: Please provide a basic cost estimate and brief description for each category below

Cost Category	Section 6 Request		Description of Expenditure
	Staff	56,240	17/hr rate, Medicare, benefits, and indirect rate (14.04%)
	Contracts		

	Expense	15,795.00	Telemetry tags, computer, sample equipment, maintenance, modification to existing vessel, gas, and travel
	Total	72,035.00	<i>Please transfer total cost to front page</i>
Project Criteria: <i>Please provide a rating for this project based on each of the following criteria. Ratings will not be the deciding factor in funding decisions, but allow us to request similar information from PIs for comparison across taxa.</i>			
Rating	Description		Justification
3	<u>Level of threat and imminent need</u> 1. Threat or need low, or unknown but suspected to be low 2. Threat or need low or unknown, but emerging issues could impact 3. Threat moderate, but emerging issues could impact 4. Threat OR need is high 5. Threat is high and project will directly address threats		<i>FWS identified threats as moderate in the 5-year status review. FWS indicated that they population from the Escambia River may be declining</i>
4	<u>Impact of Unknowns on Conservation:</u> 1. Information to address threats is known 2. Information for management is needed, but may not directly address threats 3. Information that exists needs to be better implemented AND project will address this 4. Information is needed to address threats 5. Information is needed to address threats and this project is designed to provide the information		<i>It is unknown what exactly the population bottleneck is for Gulf Sturgeon. It is presumed that anthropogenic threats are inhibiting recovery of the species. This project will address whether sufficient habitat is available to support a self-sustaining population</i>
3	<u>Feasibility of Projects:</u> 1. Methods to address threats are unknown, staff resources are unavailable, available funding is not sufficient 2. Methods are known; staff resources, funding or partner support are not adequate 3. Methods are unknown or experimental; staff and partners are fully engaged and funding is adequate 4. Methods to address threats are known; minimal concerns about one area of feasibility (staffing, funding, partner support, other) 5. Project is ready to proceed if funding provided.		<i>Methods to collect age-0 Gulf Sturgeon are unknown. This proposal proposes new experimental methods to collect this age class. Methods for determining habitat, movement, and survival are known.</i>
3	<u>Future Needs:</u> 1. Project will last at least 3 years, with potential long term funding needed 2. Project will last 3 or fewer years, but costs over \$50,000 annually, and may not fully address threats identified. 3. Project will be completed in three years and is expected to address information needs for threats <i>(This category only has 3 levels of ratings)</i>		<i>Project is design to directly address actions highlighted the 1995 Recovery/Management Plan and the 5 year Status Review.</i>
13	Total <i>(Please transfer this number to the front page.)</i>		

Literature Cited

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- Herzog D.P., V.A. Barko, J.S. Scheibe, R.A. Hrabik, and D.E. Ostendorf. 2005. Efficacy of a Benthic Trawl for Sampling Small-Bodied Fishes in Large River Systems. North American Journal of Fisheries Management. 25: 594-603.
- Kempinger J.J. 1996. Habitat, Growth, and Food of Lake Sturgeons in the Lake Winnebago System, Wisconsin. North American Journal of Fisheries Management. 16 (1). 102-114.
- Pine W.E.III, M.S. Allen, and V.J. Dreitz. 2001. Population Viability of the Gulf of Mexico Sturgeon: Inferences from Capture-Recapture and Age-Structured Models. Transactions of the American Fisheries Society. 130:1164-1174.
- Rudd M.B., R.N.M. Ahrens, W.E. Pine III, and S.K. Bolden. 2014. Empirical, Spatially Explicit Natural Mortality and Movement Rate Estimates for the Threatened Gulf Sturgeon (*Acipenser oxyrinchus desotoi*). Canadian Journal of Fisheries and Aquatic Sciences. 71: 1407-1417.
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- U.S. Fish and Wildlife Service and Gulf States Marine Fisheries Commission. 1995. Gulf Sturgeon Recovery Plan. Atlanta Ga. 170 pp.
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- Wanner G.A., D.A. Shuman, M.L. Brown, and D.W. Willis. 2012. An Initial Assessment of Sampling Procedures for Juvenile Pallid Sturgeon in the Missouri River Downstream of Fort Randall Dam, South Dakota and Nebraska.