

RPM5, Condition f, Listed Mussels Depth Distribution Survey Design

Introduction

Paragraph 7.4.5, Monitoring (RPM5), of the November 15, 2007 Amended Biological Opinion and Conference Report on the Exceptional Drought Operations (EDO) for the Interim Operations Plan (IOP) for Jim Woodruff Dam and the associated releases to the Apalachicola River includes the following requirement under Condition “f”:

“By January 5, 2008, the Corps shall design a survey for estimating the number of listed mussels present in the Action Area at 0.1-ft elevation intervals between the stage that is equivalent to a release of 5130 cfs from Woodruff Dam and an elevation that is 3 ft lower than that stage. The primary purpose of this survey is to estimate how listed mussel distribution may change with the incremental flow reductions. Due to the large size of the Action Area, the survey shall employ appropriate statistical sampling methods for estimating numbers at depth. Because the largest fraction of the numbers of listed species occur in the RM40-50 reach, at least 40% of the sampling effort shall occur in this reach.”

The USFWS agreed to extend the deadline for the survey design until January 31, 2008 concurrent with submittal of the IOP Annual Report. Based on discussions with USFWS, the following depth distribution survey is proposed.

Since most of our knowledge about mussel habitat preferences and suitability is limited to one species, the endangered fat threeridge mussel (*Amblema neislerri*), the depth distribution survey will focus on fat threeridge habitat and impacts to this species. However, several specific surveys and incidental data on Chipola slabshell (*Elliptio chipolaensis*) and purple bankclimber (*Elliptioideus sloatianus*) will be recorded and inferences can be made as appropriate regarding these species.

In December 2007 the USFWS and Corps completed efforts to identify and map fat threeridge habitat on the Apalachicola River. Habitat identification was based on the observation of several habitat characteristics that appear to be strongly correlated to fat threeridge mussel presence. These characteristics include moderately depositional areas associated with eddies; stable banks with a gentle slope (<15°); and a firm silty-sand mixture substrate. In general, these sites also tended to support willow trees of various ages along the banks and occurred immediately up or downriver of point bars. A total of 115 sites were identified as potentially suitable to support fat threeridge between RM 24 and RM 105. At each site an upstream and downstream terminus was recorded with a GPS unit, and the presence of fat threeridge was confirmed at most sites.

In October 2007, the USFWS conducted a detailed depth distribution study at 11 randomly selected sites known to support fat threeridge between RM40 and RM50 to assess the effects of water level declines on the fat threeridge population. The

methodology for this study serves as the basis for the design of the new depth distribution study described below.

Site Selection

Due to the large number of fat threeridge sites, only a portion of the 115 sites will be surveyed in order to estimate the density of fat threeridge mussels at depth. Generally, a random sampling of approximately 15-20% of the available habitat is adequate to estimate trends regarding habitat use. Therefore, 25 sites (21%) will be randomly selected for the study. In order to ensure that 40% of the sites surveyed occur in the RM40-50 reach, a stratified random sampling technique will be used and 7 sites above RM50, 10 sites between RM40-50, and 8 sites below RM40 will be selected.

Approximately 26 sites have been identified as supporting fat threeridge between RM40 and 50. The 10 sites randomly selected for this reach will be selected from the 15 sites that were not sampled in the USFWS October 2007 survey effort. This allows for an adequate number of sites to survey in this reach without revisiting sites where mussel distribution was altered by previous sampling activity. Avoidance of these previously sampled sites should also facilitate an unbiased interpretation of net movements of mussels in this reach. All of the sites will be randomly selected using random number generator software.

In addition to a sub-set of the potential fat threeridge habitat sites, the rock shoals near RM105.5 will be surveyed to collect data on purple bankclimber habitat and depth distribution at this site. This site is particularly interesting as it represents one of the only known purple bankclimber sites in the upper river where mussels are observed at depths less than 3 feet deep when river flows are approximately 5,000 cfs. The methods for this sampling effort will likely be similar to those at the fat threeridge sites with the exception of using search by feel techniques rather than excavation techniques due to the substrate material. However, the details of this sampling methodology are still being coordinated with USFWS and ERDC personnel.

The four sites in the action area known to support Chipola slabshell will also be surveyed to collect data on this species habitat and depth distribution. The sampling techniques at these sites will be identical to that at the fat threeridge sites. Information collected during these supplemental surveys will improve our knowledge about potential habitat preferences and depth distribution for these two species.

Data Collection

At each site, transect lines will be marked and recorded with a GPS unit. Each site will have varying numbers of transects based on site length. However, transects will extend over the full length of each site. Transect placement will be standardized to one transect every 40 feet of site length. The first transect will be randomly located within the first 40 feet of the upstream end of the site and subsequent transects will be placed accordingly. The 40-foot spacing is based on discussions with USFWS and ERDC personnel and review of the site length and transect placement for the October 2007 USFWS sampling

effort. Standard mussel sampling techniques for wading surveys will be used to collect all mussels within a 0.25 m² quadrat that is moved continuously along each transect beginning at the water surface and working perpendicular to shore until a depth of three feet relative to a Wewahitchka gage (located immediately upstream of the Chipola Cutoff at RM 41.8) height of 11.03 ft (approximately 5,130 cfs flow measured at the Chattahoochee, Fl gage). All material within the quadrat will be excavated in order to insure that all age classes within the quadrat are collected. Because the slope of these sites will vary, the total number of quadrats taken at each site will also vary. Due to the gradual depth changes and the large number of quadrats that occur on each transect in sites with flat slopes, only every other quadrat will be excavated at these sites. The depth at the center of each quadrat will be measured and recorded. The number and species of mussels as well as the total length of all listed species will also be recorded for each quadrat.

In addition to the quantitative mussel sampling, channel bathymetry between the water surface and a depth of 3 to 4 feet will be quantified at each site using standard survey equipment. Bathymetry data will be collected along the same transects sampled for mussels at each site. An additional transect will be placed at each end of the site in order to bracket the site. This measurement technique will involve measuring bed elevations relative to water surface elevation along multiple transects from the bank towards the thalweg. A “total station” and computer software will be used to compute how much area at the site would be exposed at 0.1-foot reductions from the surveyed water surface elevation between the shore and the maximum depth surveyed.

The data from the habitat surveys and the fat threeridge density estimates from the mussel surveys will be used to develop a relationship between the numbers of fat threeridge by depth.

Additional Studies

It is anticipated that replication of this study on some regular basis (annual or bi-annual) will also provide additional data relative to several of the life history questions outlined in condition “h” of RPM5. The design of these studies is still ongoing and will utilize data from the depth distribution study to the maximum extent practicable. Data from this study will also address condition “b” of RPM5 which requires studies that 1) periodically estimate total abundance of listed mussels in the action area; and 2) determine the fraction of the population that is located in habitats that are vulnerable to low-flow impacts. Additional studies such as the ones described in the 30 August 2007 RPM5 submittal to the USFWS that focus intensively on a few sites over a long period of time will still be needed to better understand how the mussel habitat changes over time and how the mussels respond.

Furthermore, to the extent feasible, additional data will be collected at each of the sites. This data may include additional age structure data on non-listed native species (*Glebula*) or marking of fat threeridge individuals (either all or a proportion). The details of this

additional data collection will be further refined in close coordination with USFWS once resource limitations and other constraints have been identified.