IV.B. Proposed Management Actions

The purpose of management actions is to achieve management objectives. There are two different "strategies" (a logical package of management actions) proposed to achieve management objectives. One strategy attempts to rehabilitate the Platte River towards a braided channel morphology as the underpinnings of restoring habitat for key management species (commonly referred to as "Clear/Level/Pulse"). The other strategy attempts to achieve similar management objectives by mechanical creation and maintenance of habitat for target species, which may or may not depend on the Platte River (although all actions will occur within the Platte River associated habitats). This strategy has commonly been referred to as the "clear/level/mechanical maintenance" or "clear/level/plow", although a better term may simply be "mechanical creation and maintenance" such that the clear/level portion is not hard-wired into the strategy. The Governance Committee has also committed to implementing management actions that are part of this strategy, and other groups outside of the Program will also be implementing management actions that could be considered part of this approach.

It is the intent of the Governance Committee to implement and test the management actions of these two strategies in parallel using the "stair-step" approach described in Figure 11. This parallel implementation is also consistent with the preferred means of implementing adaptive management experiments (i.e., active adaptive management).

The Governance Committee and others recognize the difficulties and potentially confounding responses from implementing both of these strategies simultaneously and the needed time to recognize changes on the various scales. Careful thought and planning in the management implementation and measurements for monitoring and research will be needed to eliminate these problems as much as possible and/or account for them in monitoring and research. The hypotheses referenced in this section are the CEM hypotheses included in the tables above.

IV.B.1. Flow-Sediment-Mechanical Approach

The Governance Committee agrees to pursue and test the concept of "clear-level-pulse" (Flow-Sediment-Mechanical Approach), with additional details related to the specific hypotheses to be tested and field tests to be developed. The following describes the objectives of the flow-sediment-mechanical pulse approach:

1. Create and maintain where possible a wide braided channel with a high width/depth ratio. The main channel width would be sized for sustainability, based on available bankfull flows (as augmented by the Program), and considering habitat and landscape characteristics. The desired braided plan form may require consolidation of the flow and river channels to maximize stream power and aided by removal of wooded banks and islands and addition of sediment.

2. Offset the existing sediment imbalance by increasing sediment inputs to the habitat area from one or more of the following sources:
    a. sand augmentation through mechanical actions- island and bank clearing and leveling,

b. sand augmentation from bank and island actions not directly related to bank cutting and island leveling (an example could be excavation associated with wetland development), or

c. reducing the imbalance through channel plan form changes, tributary delivery improvements, or flow routing changes.

3. Use the EA and other Program water to create annual peaks as large as can be sustained over many years, likely through the creation of annual, short-duration high flows within existing banks. Try to ensure that the spring peak flow is higher than any subsequent summer flow.

The focus of this concept is on several overall management objectives for Program lands including: 1) improvement of river channel areas on Program lands toward habitat complex characteristics described in Table 1 of the Land Plan (increased availability of areas of wide, shallow channel with unobstructed view and sandbars suitable for roosting and nesting); 2) maintain those improvements; and, 3) minimize or offset current river processes that tend to diminish channel areas on Program lands approximating Land Plan Table 1 characteristics. This approach would prioritize Program land acquisition upstream of Minden, Nebraska, with an objective of acquiring roughly 6,400 acres upstream of this location, and the remaining 2,800 acres downstream. By prioritizing upstream sites, overall Program habitat benefits could be maximized.

The over-arching hypothesis associated with the Flow-Sediment-Mechanical approach, as indicated by the physical processes CEMs in Section III, is that a combination of flow management, sediment management, and land management implemented concurrently will generate detectable changes in the channel morphology of the Platte River, and habitats for whooping crane, least tern, piping plover, pallid sturgeon and other species of concern. In turn, creating the habitat conditions described in Land Plan Table 1 will increase least tern and piping plover production from riverine habitats, and increase survival of migrating whooping cranes.

Species benefits may be gained by implementing one or two of the individual management actions of the Flow-Sediment-Mechanical approach, however more substantial benefits can be realized by applying these actions in tandem (e.g., when sediment is added to the river without mechanical actions, the habitat benefits may not be detectible within the First Increment of the Program; flow increases without sediment augmentation could result in negative effects). Meaningful tests of the Flow-Sediment-Mechanical approach will be compromised without implementing all three actions in concert. Following is a discussion of each of the three actions.

IV.B.1.a. Mechanical

Management Action: To increase the acreage of channel area greater than 750 feet wide by 30 percent over the 1998 baseline conditions for the study area, and restore channel habitat toward Land Plan Table 1 characteristics. The following methods and others where appropriate and effective will be used:

i. consolidate the flow and river channels to maximize stream power and help induce braided channel characteristics;

ii. mechanically cut banks and lower islands to a level that will be inundated by anticipated annual peak flows; and

iii. mechanically clear vegetation from islands and banks in the single channel as needed to aid the widening process and make sediment available for recruitment to the river.

Consolidating flows and widening the river at select locations by cutting banks and leveling islands can begin in Year 1 of the Program prior to increases in annual high flow, provided acceptable Program lands or Cooperator lands are available. Clearing vegetation and widening the river independent of consolidating flow should be concurrent with implementation of increases in annual high flows. Mechanical flow consolidating and river widening actions can occur independent of sediment augmentation, but greater increases in river width are expected at sites downstream of sand augmentation. The design and location of mechanical actions should be guided by available data, science, numerical modeling, and the availability of Program lands or cooperator lands. Where favorable conditions exist, mechanical actions may also be used to modify the topography, soils, and/or connectivity with the Platte channel on Program lands to support wet meadow conditions at these sites.

Potential Effects: The mechanical action of consolidating flows will help shift the river to a braided condition, which widens the river and creates more sand bars (CEM Physical Processes (PP) Hypothesis 3). Cutting banks and leveling islands in conjunction with pulse flows will widen the river (PP-3). Pulse flows are needed with both mechanical actions of consolidating flow and river widening to raise sand bars to an elevation suitable for least tern and piping plover nesting habitat (PP-1). Sediment augmentation is required in conjunction with increases in flows and contributes to wider sustainable channels, contributes to increases in occurrence of sand bars, restores stream bed elevation, and over time will promote the occurrence of a braided plan form in currently anastomosed reaches of the river (PP-2).

Creation of ephemeral sand bars (braided condition) with Land Plan Table 1 characteristics will increase least tern and piping plover production on riverine habitats and will reduce predation by shifting nesting locations from one year to the next and/or maintaining separation between nests and river banks (CEM Tern and Plover (TP) Hypotheses 1 and 3). Creating a wider, braided channel will reduce channel depths, and increase forage opportunities for least tern and piping plover chicks (TP-4) leading to improved growth and survival (TP-1). Increasing channel width, sand bars, and shallow water depths (braided condition) will increase roosting habitat for whooping cranes (CEM Whooping Crane (WC) Hypothesis 1), thereby increasing migration survival of whooping cranes.

Restoring stream bed elevation will increase water stage for a given flow, which will increase growing-season groundwater elevations in adjacent meadows, increasing the area/extent of wet meadow habitat. Increasing wet meadows during migrational times will increase migration survival of whooping crane.

IV.B.1.b. Sediment augmentation

Management Action: Sediment is mechanically placed into the river from banks, islands and out-of-bank areas at a rate that will eliminate the sediment deficiency and restore a balanced sediment budget within the expected future flow regime. Starting in Year 1 of the Program, choose one location on Program lands, or Cooperator lands above Overton, as this would focus sand augmentation in upstream locations which may also provide benefits for later restoration efforts downstream. River sand will be moved from approximately 20 acres and be pushed to locations and elevations where it can be mobilized by the river flow. Leveled areas would need to be lowered to the elevation that can be overtopped and scoured by a flow to prevent seedling survival. At the time of or prior to full implementation of the annual high flows in the water plan, sediment augmentation at one or more additional sites would be implemented with volumes of sand augmentation based on the estimated sediment deficiency. The rate of augmentation at each site should be guided by sediment transport rates and flows, and by monitoring at, upstream and downstream of the augmentation site. The location for these sites should be guided by the location of sediment deficiencies as determined by available data, and numerical modeling, and guided by the availability of Program lands or Cooperator lands. In addition to sand augmentation, alternative methods above will be investigated, such as channel plan form changes, improvement to tributary delivery or flow routing changes and then develop a master plan for sustaining a sediment balance over the long-term.

Potential Effects: Sand augmentation, combined with flows and mechanical actions, will have the same effects as described in Section IV.B.1.a.

IV.B.1.c. Flows

Management Action: Using the Environmental Account in Lake McConaughy and the Program's ability to deliver 5,000 cfs of Program water at Overton, as well as the flexibility in the CNPPID and NPPD canal and reservoir system operations (assuming mutually acceptable arrangement can be made for the use of that flexibility), short-duration near-bankfull flows will be generated in the habitat reach in the springtime or at other times outside of the main irrigation season. The intent is to achieve these flows, if possible, on an annual or near-annual basis.

Testing will begin in the first year of the Program with a pulse flow target of up to 5,000 cfs for three days at Overton. An "operational plan" for achieving this objective will be developed by the EA Committee or other committee, with close coordination with the ED, and implemented within the first year of the Program. This pulse flow will be monitored to test the logistics of coordinating pulse flow creation, to evaluate the effects on infrastructure, and to assess the fate and effect of the pulse as it moves to and through the habitat reach. Biologic and geomorphic monitoring and research efforts will be developed through coordination with the TAC. As the Program develops an increased ability to safely deliver pulse flow water over time, including the recovery of some lost conveyance capacity in the North Platte River at North Platte, flows of larger magnitude and/or modified durations will be generated, with increasing emphasis on achieving measurable improvements in channel morphology and habitat conditions, including increased sand bar height and reduced vegetation in the active channel.

Potential Effects: Flow modification, combined with sediment augmentation and mechanical actions, will have the same effects as described in Section IV.B.1.a. In addition, increasing flows in the central Platte River during the February-July time frame may improve habitat conditions for forage fish used by least terns (TP-4) and improve habitat conditions and help provide spawning cues for the pallid sturgeon in the lower Platte River, increasing their survival and reproduction (PS-2).

IV.B.2. Mechanical Creation and Maintenance Approach
The Governance Committee agrees to pursue and test the concept of using mechanical creation and maintenance ("clear-level-plow"), with additional details related to the specific hypotheses to be tested and field tests to be developed

The objectives of the mechanical creation and maintenance approach are:

1) Improve least tern and piping plover production by management of sandpits and riverine islands developed and maintained by mechanical and other means (e.g., herbicides, grazing, burning) without the need for pulse flows described in IV.B.1.c (TP-2 and TP-4).

2) Improve survival of whooping cranes by providing non-riverine wetlands, upland habitats, and open channel habitats similar to those described in IV.A.1 maintained with mechanical and other means without the need for pulse flows described in IV.B.1.c (WC-2).

IV.B.2.a. Sandpit Management
Management Action: To increase the amount of nesting habitat available to least terns and piping plovers the Program will acquire 200 acres of sandpits that will include at least 40 acres of bare sand. Each individual pit will have a water to bare sand ratio of 1:1 to 3:1 and bare sand areas will be islands or peninsulas with a base with half or less of the maximum width. The areas with nesting birds at time of acquisition will receive predator management that includes fencing and predator removal. Areas within these sandpits that are not being utilized by birds will be returned to bare sand peninsulas or islands, shoreline length will be maximize and predator management techniques applied.

An additional 200 acres of abandoned sandpit or habitat created by the Program which is similar in nature to sandpits will be acquired that will include at least 40 acres of bare sand. Each individual pit will have a water to bare sand ratio of 1:1 to 3:1 and bare sand areas will be islands or peninsulas with a base with half or less of the maximum width. Areas will be returned to bare sand to maximum shoreline length and predator management techniques applied.

Potential Effects: Predator management will increase least tern and piping plover fledge ratios (fledglings per adult, nest or pair). Sandpit land management will increase barren sand at suitable slope, elevation, shape, etc. to increase usable nesting area. If numbers of nesting pairs is currently limited by nesting substrate this will increase nesting pairs. Maximizing wetted area will increase plover foraging area. Diversified water depths in ponds will allow for a diverse fish assemblage to provide tern forage. Both activities would increase the number of nesting pairs if foraging habitat is limiting nesting pairs.

IV.B.2.b. Restore, Create and Maintain Bare Sand Riverine Islands and Channel Width
Management Action: Islands will be created using the same methods as in "clear-level-pulse" except for the EA augment pulses described in IV.B.1. Maintenance will require a mechanical maintenance emphasis on nesting island and surrounding channel area during low flow years.

Channels of 750 feet wide will be created and maintained using mechanical means similar to methods in the “clear-level-pulse” except for released pulses.

Predator management at known least tern and piping plover nesting colonies at constructed riverine islands will begin Year 1 of the Program.

Potential Effects: These management actions will increase barren sand on riverine islands for nesting area. If numbers of nesting pairs are currently limited by nesting substrate this will increase nesting pairs. If least terns and piping plovers prefer riverine islands for nesting over sandpits, there should be a shift in nesting off of sandpits to islands. If least terns and piping plover are more successful at reproduction on river islands, there should be greater fledge ratios over sandpits.

These management actions will also increase whooping crane roost habitat. Therefore increasing survival, based on the assumption that habitat along the Platte River limits whooping cranes survival.

IV.B.2.c. Create and Maintain Inundated Wetlands and Upland Areas

Management Action: Each 0.5 miles of linear wetland (sloughs, backwater) constructed on Program lands will include at least one area that has a shallow water area with a minimum water surface area of 500 feet by 500 feet. These areas will be designed such that they can be drained for vegetation management purposes. Where possible these wetlands will be filled by surface flow or pumping during whooping crane migration periods. These will not be necessary within the high banks when channel width already exceeds 750 feet.

The Cooperative Agreement whooping crane monitoring has resulted in many more hours of whooping crane use in corn fields compared to grasslands. Therefore, Program acquired agricultural fields not previously wetlands should be planted to corn. In addition the Program will explore enhancing the foraging value of these fields by flooding them utilizing existing irrigation equipment. One area 10 to 20 acres at least 200 yards from a road will be flooded during a spring and fall migration period to determine feasibility and cost.

All acquired properties will be evaluated for the presence of non-riverine wetlands that have been altered or filled and they will be restored to their original size.

The Program will utilize the remaining 400 acres of non-complex land to create 300 acres of palustrine wetland. These should have at least 25% of the area with a shallow water depth (approximately less than 10 inches) during whooping crane migration periods. Any upland areas acquired in the process of acquiring the desired wetland areas should have an easement attached limiting access during whooping crane migration time and the construction of permanent dwellings and animal confinement facilities and be resold or leased for other purposes such as farming, hunting or grazing at a rate that will repay the Program by the end of the first increment.

Potential Effects: Restored or created and maintained wetland areas will provide roosting and foraging areas for whooping cranes increasing survival, if habitat along the Platte River limits whooping cranes survival.

V. INTEGRATED MONITORING AND RESEARCH PLAN (IMRP)

To implement the 6-step process described in Figure 1b, the hypotheses developed in the assessment stage must be harmonized with the design of actions and associated monitoring in the design stage. The CEMs and priority hypotheses determine what is accomplished in the IMRP.

Ultimately, for each priority hypothesis, the AMP will articulate in the work plan (developed according to Section I.F1):

- what monitoring protocols will be used (Table 1);
- what management actions will be applied where and when to create spatial and temporal contrasts;
- what measurement precision of key indicators is attainable with the proposed protocols;
- what specific methods of data analysis will be used, and
- based on all of the above, what size of effects are desirable and detectable over what time period, with what levels of Type 1 and Type 2 error (e.g. concluding that a habitat feature benefits a species when in fact it does not, or concluding that a habitat feature doesn't benefit a species when in fact it does).

V.A. Introduction

As discussed above, effective adaptive management requires a thorough monitoring and research effort to collect vital knowledge for decision making. This section, Integrated Monitoring and Research Plan (IMRP) is designed to determine the biological response of the target species and their habitats to the actions throughout the entire study area, on Program lands, and in specific project management areas, during the First Increment of the Program through scientifically designed monitoring and research. The monitoring and research measures for the First Increment of the Program are composed of compliance monitoring and biological response monitoring and research (Figure 12). This section of the AMP focuses on the biological response monitoring and research for the Program. Information derived using the IMRP along with information from the FWS, state agencies, and others regarding the species biology, status, and recovery in the region, will be used to evaluate the Program's First Increment and overall species recovery assuming comparable methods and metrics are used in all areas. The Governance Committee will also use this information in the adaptive management of Program lands, Program activities, and the overall Program when developing Second Increment milestones.

Monitoring and research will be used to determine impacts on valued ecosystem components. Adaptive management decisions will be improved if statistically valid and meaningful monitoring and research data are gathered at the System, Program lands, and Project Scales during the First Increment. Monitoring activities will document trends in changes of parameters of interest in relation to measured variables (covariates) that have the potential to impact those trends. Research will necessarily be more limited in scope and scale but will provide an estimate of cause and effect relationships between management actions and outcomes. Monitoring and research information will be integrated to provide a weight of evidence supporting changes in