

## ***Attachment 7 Recovery Goals***<sup>17</sup>(from Reclamation 2005)

### Recovery Goals-Colorado Pikeminnow (Fish and Wildlife Service 2002c)

Downlisting can be considered if, over a 5-year period:

- A genetically and demographically viable, self-sustaining population is maintained in the Green River subbasin such that (a) the trends in separate adult point estimates for the middle Green River and the lower Green River do not decline significantly, and (b) mean estimated recruitment of age-6 naturally produced fish equals or exceeds mean annual adult mortality for the Green River subbasin, and (c) each population point estimate for the Green River subbasin exceeds 2,600 adults (2,600 is the estimated minimum viable population needed to ensure long-term genetic and demographic viability); and
- A self-sustaining population of at least 700 adults (numbers based on inferences about carrying capacity) is maintained in the upper Colorado River subbasin such that (a) the trend in adult point estimates does not decline significantly, and (b) mean estimated recruitment of age-6 naturally produced fish equals or exceeds mean annual adult mortality; and
- A target number of 1,000 age 5+ fish is established through augmentation and/or natural reproduction in the San Juan River subbasin; and
- Certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.

Delisting can be considered if, over a 7-year period beyond downlisting:

- A genetically and demographically viable, self-sustaining population is maintained in the Green River subbasin such that (a) the trends in separate adult point estimates for the middle Green River and the lower Green River do not decline significantly, and (b) mean estimated recruitment of age-6 naturally produced fish equals or exceeds mean annual adult mortality for the Green River subbasin, and (c) each population point estimate for the Green River subbasin exceeds 2,600 adults; and
- Either the upper Colorado River subbasin self-sustaining population exceeds 1,000 adults or the upper Colorado River subbasin self-sustaining population exceeds 700 adults and the San Juan River subbasin population is self-sustaining and exceeds 800 adults (numbers based on inferences about carrying capacity such that or each population (a) the trend in adult point estimated does not decline significantly, and (b) mean estimated recruitment of age-6 naturally produced fish equals or exceeds mean annual adult mortality; and
- Certain site-specific management tasks to minimize or remove threats have been finalized and implemented, and necessary levels of protection are attained.

### Recovery Goals-Razorback Sucker (Fish and Wildlife Service 2002d)

Downlisting can be considered if, over a 5-year period:

- Genetically and demographically viable, self-sustaining populations are maintained in the Green River subbasin and either in the upper Colorado River

---

<sup>17</sup> Recovery goals are being updated.

subbasin or the San Juan River subbasin such that (a) the trend in adult (age 4+) point estimates for each of the two populations does not decline significantly, and (b) mean estimated recruitment of age -3 naturally produced fish equals or exceeds mean annual adult mortality for each of the tow populations, and )c) each point estimate for each of the two populations exceeds 5,800 adults (5,800 is the estimated minimum viable population needed to ensure long-term genetic and demographic viability); and

- A genetic refuge is maintained in Lake Mohave of the lower basin recovery unit; and
- Certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.

Delisting can be considered if, over a 3-year period beyond downlisting:

- Genetically and demographically viable, self-sustaining populations are maintained in the Green River subbasin and either in the upper Colorado River subbasin or the San Juan River subbasin such that (a) the trend in adult point estimates for each of the two populations does not decline significantly, and (b) mean estimated recruitment of age-3 naturally produced fish equals or exceeds mean annual adult mortality for each of the two populations, and (c) each point estimate for each of the two populations exceeds 5,800 adults; and
- A genetic refuge is maintained in Lake Mohave; and
- Two genetically and demographically viable, self-sustaining populations are maintained in the lower basin recovery unit such that (a) the trend in adult point estimates for each population does not decline significantly, and (b) mean estimated recruitment of age-3 naturally produced fish equals or exceed mean annual adult mortality for each population, and (c) each point estimate for each population exceeds 5,800 adults; and
- Certain site-specific management tasks to minimize or remove threats have been finalized and implemented, and necessary levels of protection are maintained.

#### Recovery Goals-Humpback Chub (Fish and Wildlife Service 2002e)

Downlisting can be considered if, over a 5-year period:

- The trend in adult (age 4+) point estimates for each of the six extant populations does not decline significantly; and
- Mean estimated recruitment of age-3 naturally produced fish equals or exceeds mean annual adult mortality for each of the six extant populations; and
- Two genetically and demographically viable, self-sustaining core populations are maintained, such that each point estimate for each core population exceeds 2,100 adults (2,100 is the estimated minimum viable population needed to ensure long-term genetic and demographic viability); and
- Certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.

Delisting can be considered if, over a 3-year period beyond downlisting:

- The trend in adult point estimates for each of the six extant populations does not decline significantly; and
- Mean estimated recruitment of age-3 naturally produced fish equals or exceeds mean annual adult mortality for each of the six extant populations; and

- Three genetically and demographically viable, self-sustaining core populations are maintained, such that each point estimate for each core population exceeds 2,100 adults; and
- Certain site-specific management tasks to minimize or remove threats have been finalized and implemented, and necessary levels of protection are attained.

Management actions identified in the recovery goals for bonytail (Fish and Wildlife Service 2002) to minimize or remove threats to the species include:

- Provide and legally protect habitat (including flow regimes necessary to restore and maintain required environmental conditions) necessary to provide adequate habitat and sufficient range for all life stages to support recovered populations;
- Provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion;
- Investigate options for providing appropriate water temperatures in the Gunnison River;
- Minimize entrainment of subadults and adults and diversion/take-out structures;
- Investigate habitat requirements for all life stages and provide those habitats;
- Ensure adequate protection from overutilization;
- Ensure adequate protection from diseases and parasites; regulate nonnative fish releases and escapement in the main river, floodplain, and tributaries;
- Control problematic nonnative fishes as needed;
- Minimize the risk of increased hybridization among *Gila* spp.;
- Minimize the risk of hazardous-materials spills in critical habitat; and
- Remediate water-quality problems.