Scoping Notice
Aquatic Monitoring Amendment Project
Dixie National Forest
March 2009

Proposed Action

The Dixie National Forest (DNF) proposes to amend the Land and Resource Management Plan (LRMP). This non-significant amendment would eliminate aquatic macro-invertebrate biotic condition index (BCI) as a designated Management Indicator Species (MIS), eliminate the use of the BCI as a designated monitoring methodology, and include additional fish species as aquatic (MIS), This includes the following changes:

- Revise the fish species and macroinvertebrates within Table II-12 on page II-15 of the LRMP from:

SPECIES	VEGETATION TYPE(S)
Bonneville Cutthroat Trout	Pristine headwater streams
Resident Trout; a/ Rainbow, Brook, Brown, Cutthroat	Streams, rivers, lakes, reservoirs
Macroinvertebrates	Streams, rivers, lakes, reservoirs

To:

SPECIES	AQUATIC TYPE(S)
Fish Species	
Non-native trout: Brook, Brown, Rainbow, Cutthroat	Streams, lakes, reservoirs
Native Cutthroat trout: Bonneville, Colorado River	Streams, lakes, reservoirs
Virgin spinedace	Streams
Southern leatherside	Streams

- Remove the Bonneville Cutthroat trout, Resident Trout, and Macroinvertebrates sections of Table II-13 on page II-16a.

- Revise the "Aquatic Habitat Indicators" paragraph on page II-17 of the LRMP from:

  Aquatic Habitat Indicators – Because of the variety of aquatic habitats on the Forest, a combination of Indicator Species will be used. The native Bonneville cutthroat trout will be the MIS in those streams which contain native or transplanted populations. Rainbow, brown, brook, or cutthroat trout will be used in most streams and lakes on the Forest. The most common species in a

particular water body will be the MIS in that area. If fish population data is not available for a particular water body, the macroinvertebrate biotic condition index (BCI) will be used to assess fish habitat capability.

To:

Aquatic Habitat Indicators – A combination of indicator species will be monitored to assess aquatic habitat. The native Bonneville cutthroat trout and Colorado River cutthroat trout will be monitored in those streams and lakes which contain remnant or transplanted populations. If native cutthroat trout are not present within a particular water body, the most common fish species (Table II-12) present will be monitored to assess aquatic habitat.

MONITORING

This proposal includes an amendment to the MIS monitoring section. The amendment clearly defines the monitoring requirements for MIS fish species. The proposed changes are as follows:

- Revise rows d and e (and add rows f and g) on pages V-5 and V-6 of the LRMP from:

Activities, Effects, and Resources to be Measured	**Monitoring Method**	**Precision/ Reliability**	**Measurement Frequency**	**Reporting Method**	**Variation Which Would Cause Further Evaluation and/or change in Management Direction**
d. Trout: brook, brown, rainbow, cutthroat	Gill netting, electro-shocking, creel census	M/H	Annual	Annual	20% total decline in population size over a 5-year period or a major change in size or quality of catch
e. Bonneville cutthroat	Electro-shocking, R-4 GAWS habitat survey	M/H	Annual	Annual	10% decline in population in any on stream in any one year

To:

Activities, Effects, and Resources to be Measured	**Monitoring Method**	**Precision/ Reliability**	**Evaluation Interval**	**Reporting Method ***	**Variation Which Would Cause Further Evaluation and/or change in Management Direction ****
d. Non-native trout: brook, brown, rainbow, cutthroat	Gill netting, electro-shocking, creel census	M/H	5-year	Annual	20% total decline in estimated population size over a 5-year period or a major change in size or quality of catch

e. Native cutthroat trout: Bonneville, Colorado River	Gill netting, electro-shocking, creel census	M/H	7-year***	Annual	10% decline in estimated population size over a 7-year period or a major change in size or quality of catch
f. Virgin spinedace	Electro-shocking	M/H	5-year	Annual	20% decline in occupied habitat (stream miles) in any 5-year period
g. Southern leatherside	Electro-shocking	M/H	5-year	Annual	20% decline in occupied habitat (stream miles) in any 5-year period

*A subset of streams, lakes, and reservoirs will be monitored and reported on annually.
** If attributed to management activities.
*** Native cutthroat trout monitoring is led by the Utah Division of Wildlife Resources under the auspices of the Bonneville and Colorado cutthroat trout Coordination Teams. Monitoring activities for native cutthroat trout streams are conducted on a seven-year interval.

Purpose and Need

The purpose of the proposed forest plan amendment is to update the methodologies used and the species monitored to assess aquatic habitat on the Dixie National Forest.

This action is needed because the current aquatic MIS list does not adequately represent aquatic species and their associated habitat across the forest. The Current Forest Plan states that, "If fish population data is not available for a particular water body, the macroinvertebrate biotic condition index will be used," and goes on to set a BCI level of 70 (indicative of the divide between good and poor water quality in Winget and Magnum [1979]) as the standard for Forest streams. A single aquatic macroinvertebrate metric, such as the BCI, is not effective at evaluating aquatic habitat quality across the Forest because it can easily be affected by natural variation in watershed characteristics, as well as local variation in habitat features (Angradi 1996, Vinson and Hawkins 1998, Hawkins et al. 2000a). Using aquatic macroinvertebrates, and particularly the BCI as the standard of measurement, as a surrogate for fish population MIS information is problematic for the following reasons:

- Several factors independent of disturbance can influence both stream condition and the aquatic macroinvertebrate community. Watershed climate, geology, topography, and vegetation control the discharge, substrate and nutrient characteristics of stream systems within the catchment (Allan 1995). These variables in turn exert a controlling influence on the aquatic biota of the streams within the catchment. The Dixie National Forest straddles the divide between the Great Basin and the Colorado Plateau and varied geology, precipitation patterns, topography, and vegetation exist in the watersheds across the Forest. These variations in stream ecotype would be expected to produce different aquatic communities. Additionally, local variations in stream habitat can often account for a substantial amount of variation in aquatic invertebrate sample data (Hawkins et al. 2000a, Ostermiller and Hawkins 2004). Therefore, streams across the Forest

will vary widely in the structure and diversity of macroinvertebrate communities making it difficult to hold streams on the Forest to a single standard like the BCI.

- The BCI uses a limited number of physical characteristics (e.g. sulfate, alkalinity, substrate, stream gradient) coupled with the water quality tolerances of macroinvertebrate species that are present to characterize a stream's condition in relation to its potential. However, the BCI does not consider or utilize many other metrics that can be generated from macroinvertebrate data, such as total taxa richness, number of long-lived taxa, number of intolerant taxa, species habit (e.g. clinger), number of EPT taxa, percent predators, and functional feeding group. While individually some of the metrics may be sensitive to certain kinds of disturbance, changes in the metric can also be related to natural catchment characteristics. In short, the BCI data provides a narrow perspective of aquatic habitat condition, is highly variable, and fails to fully describe the quality of aquatic habitat for fish in a location.

  In the thirty years since the development of the BCI, bioassessment using aquatic macroinvertebrates has evolved from examining a variety of diversity indices, to developing a multi-metric index or a predictive model (Karr 1981, Plafkin et al. 1989, Rosenberg and Resh 1993, Wright 1995, Barbour et al. 1999, Hawkins et al. 2000b). The multi-metric index approach builds a composite index based upon multiple macroinvertebrate community metrics, while the predictive model calculates the ratio of observed taxa from "test" streams versus the expected taxa from "reference" streams that are similar in character. Both these approaches require extensive reference site development and some sort of classification scheme to partition out the variation attributable to natural causes (e.g. elevation, geology, etc.); however, both approaches can be heavily influenced by local habitat variability (Hawkins et al. 2000b). While debate has surrounded the most appropriate method, both approaches have shown strengths and limitations (Reynoldson et. 1997, Karr and Chu 2000, Norris and Hawkins 2000). Many western states appear to be moving toward the use of predictive models or a combination of the two models (Ostermiller and Hawkins 2004, Hargett et al. 2006, Jessup et al. 2006, Stribling et al. 2008). Unfortunately, at present neither approach has a model/metric developed for southern Utah streams.

- Aquatic macroinvertebrate data are expensive to generate and are somewhat redundant where fish communities are able to be monitored. Given the limitations of equipment and personnel, the Dixie National Forest has generally performed the field data collection in house and contracted the macroinvertebrate identification and data summarization to private macroinvertebrate laboratories. Additionally, turn around time for sample processing can take from 3-12 months (sometimes even longer), limiting the effectiveness of using macroinvertebrates as a tool to influence management activities in a timely manner. Fish communities can also be used to monitor stream ecosystem health (Karr 1981). Mebane (2001) showed that macroinvertebrate index scores and salmonid population and age structure data were both able to distinguish differences in habitat quality and

changes in fine sediment percentage. Similarly, Griffith et al. (2005) found that metrics based on the fish, macroinvertebrate, and periphyton communities were all sensitive to certain stressors; however, they recommended using the community assemblage to evaluate impacts from all stressors. While fish data may be slightly more labor intensive to collect in the field, there is little extended processing time, or cost, after field collection. The data are also immediately available, allowing for potential management impacts to be assessed quickly and efficiently.

Given the above problems and limitations with the BCI, and aquatic macroinvertebrates in general, as an MIS tool, the Dixie National Forest has determined that the Bonneville cutthroat trout (BCT), Colorado River cutthroat trout, and resident trout (i.e. non-native salmonids) would be monitored as aquatic MIS, because the condition and trend of these species across the forest and within specific watersheds is indicative of overall aquatic ecosystem condition. The inclusion of Virgin spinedace and Southern leatherside as aquatic MIS would ensure monitoring in fish bearing streams that do not contain trout populations. Populations of these species can be easily and efficiently monitored within both lentic and lotic ecosystems, and standard population monitoring techniques (i.e. electro-shocking, gill-netting, etc.) are cost effective and readily accomplished. Fish population monitoring provides an opportunity for partnership with the Utah Division of Wildlife Resources (UDWR)

The Forest does acknowledge the value of aquatic macroinvertebrate data for specific purposes and aquatic macroinvertebrate analysis would still be used to help evaluate site specific impacts.