APPENDIX C-2. TERRESTRIAL ECOLOGY – TERRESTRIAL WETLAND WILDLIFE SPECIES

Table C-2.1 Terrestrial/Wetland Wildlife Species, by Community Types, That may Occur in the Vicinity of Tellico Reservoir

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands (Old Fields and Ag. Fields)	Wetland and Riparian Communities
Amphibians				
Bullfrog	*Rana catesbeiana*			X
Eastern Narrowmouth Toad	*Gastrophryne carolinensis*			X
Green Frog	*Rana clamitans*			X
Wood Frog	*Rana sylvatica*	X		X
Spring Peeper	*Pseudacris crucifer*			X
Woodhouse's Toad	*Bufo woodhousei*	X		
Spotted Salamander	*Ambystoma maculatum*	X	X	
Dusky Salamander	*Desmognathus fuscus*	X		X
Mountain Dusky Salamander	*Desmognathus ochrophaeus*	X		X
Blackbelly Salamander *	*Desmognathus quadramaculatus*	X		X
Longtail Salamander	*Eurycea longicauda*	X		
Spring Salamander	*Gyrinophilus porphyriticus*			X
Northern Slimy Salamander	*Plethodon glutinosus*	X		
Ravine Salamander	*Plethodon richmondi*	X		
Red Salamander	*Pseudotriton ruber*			X
Reptiles				
Black Rat Snake	*Elaphe obsoleta obsoleta*	X		
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*	X	X	X
Northern Ringneck Snake	*Diadophis punctatus edwardsii*	X		
Northern Water Snake	*Nerodia sipedon sipedon*			X
Northern Fence Lizard	*Sceloporus undulatus hyacinthinus*	X		
Five-lined Skink	*Eumeces fasciatus*	X	X	
Broadhead Skink	*Eumeces laticeps*	X		
Common Snapping Turtle	*Chelydra serpentina serpentina*			X
Painted Turtles	*Chrysemys picta spp.*			X
Red-eared Slider	*Trachemys scripta elegans*			X
Eastern Box Turtle	*Terrapene carolina carolina*	X	X	
Birds				
Bald Eagle *	*Haliaeetus leucocephalus*			X
Osprey *	*Pandion haliaetus*			X
Cooper's Hawk *	*Accipiter cooperii*	X	X	
Red-shouldered Hawk	*Buteo lineatus*	X		X

Table C-2.1 Terrestrial/Wetland Wildlife Species, by Community Types, That may Occur in the Vicinity of Tellico Reservoir

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands (Old Fields and Ag. Fields)	Wetland and Riparian Communities
Red-tailed Hawk	*Buteo jamaicensis*	X	X	
American Kestrel	*Falco sparverius*		X	
Great Horned Owl	*Bubo virginianus*	X	X	X
Barred Owl	*Strix varia*	X		X
Common Screech Owl	*Otus asio*	X	X	
Barn Owl *	*Tyto alba*		X	
Turkey Vulture	*Cathartes aura*	X		
Black Vulture	*Coragyps atratus*	X		
American Crow	*Corvus brachyrhynchos*	X	X	
Hairy Woodpecker	*Picoides villosus*	X		X
Pileated Woodpecker	*Dryocopus pileatus*	X		X
Yellow-shafted Flicker	*Colaptes auratus*	X	X	
Downy Woodpecker	*Picoides pubescens*	X		X
Red-bellied Woodpecker	*Melanerpes carolinus*	X	X	
Belted Kingfisher	*Megaceryle alcyon*			X
Great Blue Heron	*Ardea herodias*			X
Black-crowned Night-Heron	*Nycticorax nycticorax*			X
Green Heron	*Butorides striatus*			X
Spotted Sandpiper	*Actitis macularia*			X
Killdeer	*Charadrius vociferus*		X	X
Wild Turkey	*Meleagris gallopavo*	X	X	
Bobwhite Quail	*Colinus virginianus*		X	
Ruffed Grouse	*Bonasa umbellus*	X		
Mourning Dove	*Zenaida macroura*		X	
Canada Goose	*Branta canadensis*		X	X
Wood Duck	*Aix sponsa*			X
Mallard	*Anas platyrhynchos*			X
Blue-winged Teal	*Anas discors*			X
American Black Duck	*Anas rubripes*			X
Pied-bill Grebe	*Podilymbus podiceps*			X
Northern Cardinal	*Cardinalis cardinalis*	X	X	
Eastern Bluebird	*Sialia sialis*		X	
American Goldfinch	*Carduelis tristis*	X	X	
Grasshopper Sparrow *	*Ammodramus savannarum*		X	
Blue Jay	*Cyanocitta cristata*	X		
Carolina Chickadee	*Parus carolinensis*	X	X	
Red-winged Blackbird	*Agelaius phoeniceus*		X	X

Table C-2.1 Terrestrial/Wetland Wildlife Species, by Community Types, That may Occur in the Vicinity of Tellico Reservoir

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands (Old Fields and Ag. Fields)	Wetland and Riparian Communities
Rufous-sided Towhee	*Pipilo erythrophthalmus*	X	X	
American Robin	*Turdus migratorius*	X	X	
Northern Mockingbird	*Mimus polyglottos*		X	
Carolina Wren	*Thryothorus ludovicianus*	X	X	
Indigo Bunting	*Passerina cyanea*		X	
Tufted Titmouse	*Parus bicolor*	X		
White-breasted Nuthatch	*Sitta carolinensis*	X		X
Yellow-billed Cuckoo	*Coccyzus americanus*	X	X	
Black-and-white Warbler	*Mniotilta varia*	X		
Wood Thrush	*Hylocichla mustelina*	X		
Eastern Wood Pewee	*Contopus virens*	X		
Red-eyed Vireo	*Vireo olivaceus*	X		
Pine Warbler	*Dendroica pinus*	X		
Great Crested Flycatcher	*Myiarchus crinitus*	X		
Mammals				
Whitetail Deer	*Odocoileus virginianus*	X	X	X
Gray Squirrel	*Sciurus carolinensis*	X		
Southern Flying Squirrel	*Glaucomys volans*	X		
Eastern Chipmunk	*Tamias striatus*	X	X	
Raccoon	*Procyon lotor*	X		X
Eastern Cottontail Rabbit	*Sylvilagus floridanus*		X	
Bobcat	*Lynx rufus*	X		X
Red Fox	*Vulpes vulpes*		X	
Gray Fox	*Urocyon cinereoargenteus*	X	X	
Coyote	*Canis latrans*		X	
Mink	*Mustela vison*			X
Muskrat	*Ondatra zibethicus*			X
Opossum	*Didelphis virginiana*	X	X	
Striped Skunk	*Mephitis mephitis*	X	X	
Groundhog	*Marmota monax*	X	X	
White-footed Mouse	*Peromyscus leucopus*	X	X	
Woodland Jumping Mouse *	*Napaeozapus insignis*	X	X	X
Meadow Jumping Mouse *	*Zapus hudsonius*	X	X	X
Deer Mouse	*Peromyscus maniculatus*	X	X	
Allegheny Woodrat *	*Neotoma magister*	X		
Southern Bog Lemming *	*Synaptomys cooperi*	X		X
Eastern Mole	*Scalopus aquaticus*	X	X	
Least Shrew	*Cryptotis parva*		X	X
Southeastern Shrew *	*Sorex longirostris*	X		X
Short-tailed Shrew	*Blarina brevicauda*	X		X
Gray Bat *	*Myotis grisescens*			X

Table C-2.1 Terrestrial/Wetland Wildlife Species, by Community Types, That may Occur in the Vicinity of Tellico Reservoir

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands (Old Fields and Ag. Fields)	Wetland and Riparian Communities
Indiana Bat *	*Myotis sodalis*	X		X
Eastern Small-footed Myotis *	*Myotis leibii*	X		X

* Species listed as endangered, threatened, or in need of management federally, by the state of Tennessee, or recommended by the Tennessee Wildlife Resources Agency.

APPENDIX C-3. CONDITION OF HYDROLOGIC UNITS (HUC), RESOURCE ISSUES AND PARCEL ACREAGES BY HUC

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC

HUC ID	Parcel	Acres	Primary Drainage	HUC Rating	Primary Resource Issues
TN-06010201-130	1	33.3		Poor	Lack of public access along the north shore
TN-06010201-140	1	322.1	Browder Bend	Poor	Access development potential, farms being developed
TN-06010201-140	2	6.2			
NC-06010204-010	NP		Tulula Creek	Fair	Agriculture and urban runoff
NC-06010204-020	NP		Santeetlah Lake	Poor	Agriculture runoff, nutrient enrichment, flowage
NC-06010204-030	NP		Tellico headwaters	Poor	Sedimentation and siltation, unpaved roads.
TN-06010204-030	NP		Calderwood Lake	Good	
TN-06010204-040	NP		Upper Abrams Cr.	Good	Park, rare species
TN-06010204-050	NP		Lower Abrams Cr.	Fair	Some development, no access sites, some agricultural.
TN-06010204-060	5	37.1	Little Tennessee R. /Chilhowee Lake	Fair	Agricultural runoff, development, water supply
TN-06010204-060	63	242.6			
TN-06010204-060	72	5.9			
TN-06010204-060	73	5.0			
TN-06010204-060	74	387.5			
TN-06010204-060	75	19.4			
TN-06010204-060	76	21.2			
TN-06010204-060	77	8.5			
TN-06010204-060	78	108.2			
TN-06010204-060	79	2146.7			
TN-06010204-060	80	611.5			
TN-06010204-060	81	29.0			
TN-06010204-060	82	2.1			
TN-06010204-060	83	1.8			
TN-06010204-060	84	2.2			
TN-06010204-060	85	70.2			
TN-06010204-060	86	2.0			
TN-06010204-060	87	78.6			
TN-06010204-060	88	45.2			

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC

HUC ID	Parcel	Acres	Primary Drainage	HUC Rating	Primary Resource Issues
TN-06010204-060	89	21.1	*continued.*		
TN-06010204-060	90	12.6			
TN-06010204-060	91	24.1			
TN-06010204-070	5	1.5	Ninemile Creek	Poor	Failing septic tanks, agricultural runoff, residential development
TN-06010204-070	63	14.5			
TN-06010204-070	64	7.9			
TN-06010204-070	65	4.2			
TN-06010204-070	66	27.6			
TN-06010204-070	67	17.3			
TN-06010204-070	68	77.0			
TN-06010204-070	69	13.0			
TN-06010204-070	70	8.5			
TN-06010204-070	71	11.1			
TN-06010204-070	72	3.2			
TN-06010204-080	NP		Bald River	Fair	Sedimentation and siltation
TN-06010204-090	137	8.3	Tellico River /Tellico Plains	Poor	Sedimentation and siltation, vegetation removal along riverbanks, failing streambanks, agricultural runoff
TN-06010204-090	138	0.3			
TN-06010204-100	5	9.3	Tellico River /Big Creek	Poor	Trash and litter, poor access, agricultural runoff, informal recreation sites, development, encroachments, habitat enhancement for wildlife, pine plantations
TN-06010204-100	117	18.1			
TN-06010204-100	123	51.2			
TN-06010204-100	126	186.2			
TN-06010204-100	127	7.1			
TN-06010204-100	128	184.7			
TN-06010204-100	129	11.8			
TN-06010204-100	130	12.2			
TN-06010204-100	131	81.5			
TN-06010204-100	132	256.3			
TN-06010204-100	133	3.8			
TN-06010204-100	134	149.7			
TN-06010204-100	135	34.5			
TN-06010204-100	136	1.5			
TN-06010204-100	137	156.4			

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC

HUC ID	Parcel	Acres	Primary Drainage	HUC Rating	Primary Resource Issues
TN-06010204-100	138	126.9	*continued.*		
TN-06010204-100	139	2.9			
TN-06010204-110	119	8.7	Ballplay Creek	Poor	Riparian degradation, agricultural runoff, violations and encroachments, some development
TN-06010204-110	120	9.3			
TN-06010204-110	121	21.3			
TN-06010204-110	122	6.8			
TN-06010204-110	123	223.9			
TN-06010204-110	124	199.2			
TN-06010204-120	5	0.2	Tellico River /Confluence with Little T	Fair	Urban and residential runoff, residential development, agricultural runoff, shoreline erosion
TN-06010204-120	58	0.0			
TN-06010204-120	59	6.2			
TN-06010204-120	60	0.0			
TN-06010204-120	63	618.4			
TN-06010204-120	92	7.9			
TN-06010204-120	93	65.0			
TN-06010204-120	94	36.6			
TN-06010204-120	95	68.0			
TN-06010204-120	96	13.4			
TN-06010204-120	97	79.1			
TN-06010204-120	98	27.8			
TN-06010204-120	99	3.0			
TN-06010204-120	100	17.3			
TN-06010204-120	101	11.9			
TN-06010204-120	102	20.9			
TN-06010204-120	103	67.2			
TN-06010204-120	104	104.1			
TN-06010204-120	105	10.5			
TN-06010204-120	106	55.1			
TN-06010204-120	107	18.6			
TN-06010204-120	108	193.7			
TN-06010204-120	109	3.0			
TN-06010204-120	110	266.8			
TN-06010204-120	111	18.1			

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC

HUC ID	Parcel	Acres	Primary Drainage	HUC Rating	Primary Resource Issues
TN-06010204-120	117	150.3	*continued*		
TN-06010204-120	118	166.4			
TN-06010204-120	119	40.0			
TN-06010204-120	125	4.1			
TN-06010204-120	126	9.6			
TN-06010204-130	103	33.4	Notchy Creek	Poor	Loss of riparian zones, fringe wetlands, informal recreation, streambank erosion, agricultural runoff
TN-06010204-130	112	45.6			
TN-06010204-130	113	10.1			
TN-06010204-130	114	31.9			
TN-06010204-130	115	19.7			
TN-06010204-130	116	28.9			
TN-06010204-130	117	476.7			
TN-06010204-140	1	255.7	Little Tennessee /Tellico Lake	Poor	Industrial development, fish consumption advisory, road construction, poor access
TN-06010204-140	3	169.9			
TN-06010204-140	4	95.1			
TN-06010204-140	5	36.6			
TN-06010204-140	6	41.9			
TN-06010204-140	7	27.7			
TN-06010204-140	8	45.4			
TN-06010204-140	9	339.8			
TN-06010204-140	10	84.2			
TN-06010204-140	11	502.1			
TN-06010204-140	12	1.9			
TN-06010204-140	13	152.7			
TN-06010204-140	14	22.9			
TN-06010204-140	15	18.2			
TN-06010204-140	16	26.3			
TN-06010204-140	17	2.4			
TN-06010204-140	18	8.6			
TN-06010204-140	19	44.0			
TN-06010204-140	20	82.0			
TN-06010204-140	21	13.0			
TN-06010204-140	22	49.4			

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC

HUC ID	Parcel	Acres	Primary Drainage	HUC Rating	Primary Resource Issues
TN-06010204-140	23	140.1	*continued*		
TN-06010204-140	24	85.3			
TN-06010204-140	26	122.4			
TN-06010204-140	27	15.3			
TN-06010204-140	28	22.9			
TN-06010204-140	29	13.1			
TN-06010204-140	30	5.6			
TN-06010204-140	44	92.5			
TN-06010204-140	45	16.7			
TN-06010204-140	46	18.2			
TN-06010204-140	47	16.0			
TN-06010204-140	48	5.0			
TN-06010204-140	52	129.8			
TN-06010204-140	53	11.7			
TN-06010204-140	54	18.5			
TN-06010204-140	55	17.3			
TN-06010204-140	56	31.0			
TN-06010204-140	57	16.2			
TN-06010204-140	58	31.4			
TN-06010204-140	59	10.4			
TN-06010204-140	60	17.4			
TN-06010204-140	61	19.1			
TN-06010204-140	62	18.2			
TN-06010204-140	63	27.5			
TN-06010204-140	94	0.9			
TN-06010204-140	96	0.0			
TN-06010204-150	5	5.2	Baker Creek	Poor	Home development, habitat loss, sedimentation and siltation, riparian loss, agricultural vegetation use.
TN-06010204-150	29	18.8			
TN-06010204-150	30	3.5			
TN-06010204-150	31	3.9			
TN-06010204-150	32	4.9			
TN-06010204-150	33	25.9			
TN-06010204-150	34	6.0			

Table C-3.1 Condition of Hydrologic Units (HUC) Resource Issues and Parcel Acreages by HUC					
HUC ID	**Parcel**	**Acres**	**Primary Drainage**	**HUC Rating**	**Primary Resource Issues**
TN-06010204-150	35	5.7	*continued*		
TN-06010204-150	36	20.6			
TN-06010204-150	37	5.4			
TN-06010204-150	38	2.7			
TN-06010204-150	39	152.1			
TN-06010204-150	40	30.1			
TN-06010204-150	41	9.2			
TN-06010204-150	42	26.0			
TN-06010204-150	43	19.1			
TN-06010204-150	44	7.9			
TN-06010204-160	45	6.8	Bat Creek	Poor	Agricultural runoff, some development, loss of riparian zones.
TN-06010204-160	46	32.8			
TN-06010204-160	47	6.9			
TN-06010204-160	49	14.0			
TN-06010204-160	50	37.1			
TN-06010204-160	51	34.0			
TN-06010204-170	5	0.5	Fork Creek	Poor	Failing septic tanks, sedimentation and siltation
TN-06010204-170	13	69.4			
TN-06010204-170	14	21.8			
TN-06010204-170	24	4.8			
TN-06010204-170	25	7.5			
TN-06010204-180	5	13.1	Citico Creek	Fair	Sediment from unpaved roads, rare species, poor boat access
TN-06010204-180	79	197.9			

NP denotes no parcel tracts.

APPENDIX C-4. RESERVOIR FISH ASSEMBLAGE INDEX (RFAI)

This discussion of TVA's RFAI methodology was taken from the report of 1998 sampling results (TVA, 1999), but is generally applicable to previous years' sampling and data analysis. Fish are usually included in aquatic monitoring programs because they are important to the aquatic foodweb and because they have a long life cycle which allows them to integrate conditions over time. Fish are also important to the public for aesthetic, recreational, and commercial reasons.

Reservoir fish communities are vastly different from that in the river prior to impoundment due to habitat alterations. Also, differences are expected along a longitudinal gradient with a more riverine community expected at the upper end or inflow of a reservoir and a more lacustrine community expected in the pool near the dam. Other factors to consider in evaluating biotic communities in reservoirs include reservoir operational characteristics (e.g., water depth, water level fluctuation, depth of drawdown for flood control, retention time, stratification, bottom anoxia, substrate type and stability, and depth of withdrawal for discharge) and physical/chemical features owing to geological characteristics of different ecoregions.

All these factors, plus the fact that a reservoir is an artificial system, must be considered in selecting community characteristics or expectations that will be used to evaluate aquatic resource conditions. Given that reservoirs are artificial systems, it is not possible to use the well accepted Index of Biotic Integrity (IBI) approach of using reference sites to determine characteristics or expectations of a reservoir unaffected by human impacts. By definition, IBI specifies that reference conditions should be developed from natural, unaltered habitats (Karr and Dudley, 1981). Therefore, other approaches must be utilized; such as using historical or preimpoundment conditions, predictive models, best observed conditions, or professional judgment. As stated above, preimpoundment conditions are inappropriate due to habitat alterations. The state of the understanding of fish communities in reservoirs simply is insufficient for models to effectively predict species composition and relative abundance. TVA's experience has found use of best observed conditions adjusted using professional judgment as the best approach. Use of best observed conditions requires an extensive database to determine expectations for each metric, and use of professional judgment to adjust scoring ranges requires substantial experience with the group of reservoirs under consideration. To use this concept, results in the data base which approach desired conditions for a given community characteristic are considered representative of best observed conditions. Monitoring results falling within that range would be considered "good."

Another important consideration in developing reference conditions is that care must be taken to compare only those reservoirs for which comparison is appropriate. That is, only those in the same ecoregion and equivalent physical characteristics should be compared. Hence, separation of reservoirs into appropriate classes is a critical step. TVA's monitoring program includes 31

reservoirs. For classification purposes these have been divided into two major groups: run-of-the-river reservoirs (those with short retention times and winter drawdown of only a few feet) and tributary reservoirs (those with long retention times and substantial winter drawdowns). The tributary reservoirs have been further divided into three groups by ecoregion and reservoir physical characteristics. Fish assemblage expectations for each metric (discussed later) have been developed for each of these four reservoir categories.

Table C-4.1 Run-of-River and Tributary Reservoirs

Run-of-River Reservoirs	Tributary Reservoirs		
	Blue Ridge Ecoregion	**Ridge and Valley Ecoregion**	**Interior Plateau Ecoregion**
Kentucky	Apalachia	Cherokee	Tims Ford
Pickwick	Hiwassee	Ft. Patrick Henry	Normandy
Wilson	Chatuge	Boone	Bear Creek
Wheeler	Nottely	South Holston	Little Bear Creek
Guntersville	Parksville	Douglas	Cedar Creek
Nickajack	Blue Ridge	Norris	Beech
Chickamauga	Fontana		
Watts Bar	Watauga		
Fort Loudoun			
Tellico			
Melton Hill			

Sample Collection Methods

Shoreline electrofishing samples were collected during daylight hours from forebay and transition (mid-reservoir) zones of most reservoirs during autumn (September through November 1998). In addition, inflow areas (generally the tailwater area of the upstream data) were sampled on most run-of-the-river reservoirs. Only the forebay was sampled on very small reservoirs or reservoirs where zones were indistinguishable.

A total of 15 electrofishing transects, each covering 300 m of shoreline, was collected from each of the sampled zones. All habitats were sampled in proportion to their occurrence in the zone. Twelve experimental gill nets with five 6.1 m panels (mesh sizes of 2.5, 5.1, 7.6, 10.2, and 12.7 cm) were set for one overnight period in forebay and transition zones. Excessive current prevented use of gill nets in mainstream inflow areas limiting sampling to only electrofishing in these locations. Nets were set in all habitat types, alternating mesh sizes toward the shoreline between sets.

Total length (mm) and weight (g) were obtained for all sport species and channel catfish. Remaining species captured were enumerated prior to release. During electrofishing, fish observed, but not captured, were included if positive identification could be made and counts were estimated when high densities of identifiable fish were encountered. Young-of-year fish were counted separately and were excluded from proportional and abundance metrics due to sampling inefficiencies. Only fish examined closely as a result of obtaining length and weight measurements were inspected externally for signs of disease, parasites, and anomalies. Other species groups often included several individuals which were observed, but not captured, thus the ratio of diseased, etc., was not obtainable for these groups. Natural hybrids (i.e., those known not to be part of a fisheries management program) were included as an anomaly. Field data loggers or data sheets were used to record all sampling results.

Reservoir Fish Assemblage Index (RFAI)

The RFAI uses 12 fish community metrics from five general categories (Hickman and McDonough, 1995). The 12 metrics include:

Species Richness and Composition

1. **Total number of species**--Greater numbers of species are considered representative of healthier aquatic ecosystems. As conditions degrade, numbers of species at a site decline.
2. **Number of piscivore species**--Higher diversity of piscivores is indicative of better quality environment.
3. **Number of sunfish species**--Lepomid sunfish (excludes black basses, crappies, and rock bass) are basically insectivores, and high diversity of this group is indicative of reduced siltation and suitable sediment quality in littoral areas.
4. **Number of sucker species**--Suckers are also insectivores but inhabit the pelagic and more riverine sections of reservoirs.
5. **Number of intolerant species**--This group is made up of species that are particularly intolerant of habitat degradation. Higher densities of intolerant individuals represent better environmental quality.
6. **Percentage of tolerant individuals** (excluding Young-of-Year)--This metric signifies poorer quality with increasing proportions of individuals tolerant of degraded conditions.
7. **Percentage dominance by one species**--Ecological quality is considered reduced if one species dominates the resident fish community.

Trophic Composition

8. **Percentage of individuals as omnivores**--Omnivores are less sensitive to environmental stresses due to their ability to vary their diets. As trophic links are disrupted due to degraded conditions, specialist species such as insectivores decline while opportunistic omnivorous species increase in relative abundance.

9. **Percentage of individuals as insectivores**--Due to the special dietary requirements of this group of species and the limitations of their food source in degraded environments, proportion of insectivores increases with environmental quality.

Reproductive Composition

10. **Number of lithophilic spawning species**--Lithophilic broadcast spawners spawn over rocky substrate and do not provide parental care. This guild is expected to be sensitive to siltation. Numbers of lithophilic spawning species increase in reservoirs providing suitable conditions reflective of good environmental quality.

Abundance

11. **Total catch per unit effort** (number of individuals)--This metric is based upon the assumption that high quality fish assemblages support large numbers of individuals.

Fish Health

12. **Percentage individuals with anomalies**--Incidence of diseases, lesions, tumors, external parasites, deformities, blindness, and natural hybridization are noted for all fish measured, with higher incidence indicating poor environmental conditions.

Establishing scoring criteria (i.e., expectations or reference conditions) requires a substantial data base for each class of reservoir and assumes the data base contains reservoirs with conditions ranging from poor to good for each metric. The smaller the number of reservoirs within a class, the less likely these assumptions can be met and the greater the need for sound professional judgment based on extensive knowledge of reservoir communities being studied. One way to help alleviate this problem is to use several years of results from reservoirs within a class. This not only helps establish baseline conditions for each reservoir, but also has the desirable effect of increasing the data base from which scoring criteria can be developed. However, care must be taken to keep this time period as short as possible; otherwise, constantly changing criteria will prevent recognition of improvements or degradation, if they occur. This potential problem was realized as this monitoring program was being conceived. As a result, it was decided that the maximum desired period to establish baseline conditions and provide the data base to develop scoring criteria would be five years, assuming variations of low, normal, and high flows were experienced in that time frame. This proved to be the case. In practice, scoring criteria for RFAI metrics were reevaluated each year

from 1990 through 1994 as new data were added. Scoring criteria have not been adjusted since 1994.

In developing scoring criteria, a slightly different approach was used for species richness metrics than for abundance and proportional metrics. For species richness metrics, a list was made of all species collected from comparable locations within a reservoir class from 1990 - 1994. This species list was adjusted using inferences of experienced biologists knowledgeable of the reservoir system, resident fish species, susceptibility of each species to collection methods being used, and effects of human-induced impacts on these species. This effort resulted in a list of the maximum number of species expected to occur at a sampling location and be captured by collection devices in use. Given that only one collection effort is exerted each year, this maximum number of species would not be expected to be represented in that one collection. Therefore, the range from zero to 95 percent of the maximum was trisected to provide the three scoring ranges (good, fair, and poor). Although even 95 percent of the maximum number of species at a site would not be expected to be collected in one sampling event, this "high" expectation was adopted to keep these metrics conservative in light of potential uncertainties introduced by relying heavily on professional judgment.

Scoring criteria for proportional metrics and the abundance metric were determined by trisecting observed ranges after omitting outliers. Next, cutoff points between the three ranges were adjusted based on examination of frequency distributions of observed data for each metric along with professional judgment. In some cases, the narrow range of observed conditions required further adjustment based on knowledge of metric responses to human-induced impacts observed in other reservoir classes.

Scoring criteria are used to separate results for each metric into three categories assumed to represent relative degrees of condition of the fish assemblage ranging from good to poor. Each category has a corresponding value: good = 5; fair = 3; and poor = 1. The sum of the 12 metrics constitutes the RFAI score.

Scoring criteria were applied differently to results from the two collection methods (electrofishing and experimental gill netting) depending on the type metric. For the taxa richness, reproductive composition, and fish health metrics, sampling results were pooled prior to scoring. For abundance and proportional metrics, electrofishing and gill netting results were scored separately, then the two scores averaged to arrive at a final metric value.

To arrive at an evaluation of the condition of the fish assemblage at a sample location, scores were evaluated as follows:

Table C-4.2 RFAI Scores and Community Conditions

RFAI Score	12-21	22-31	32-40	41-50	51-60
Community Condition	Very Poor	Poor	Fair	Good	Excellent

References

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Tennessee Valley Authority. 1999. Aquatic Ecological Health Determinations for TVA Reservoirs—1998. An Informal Summary of 1998 Vital Signs Monitoring Results and Ecological Health Determination Methods. Primary authors/editors: Don L. Dycus, Dennis L. Meinert, and Tyler F. Baker. TVA Water Management, Clean Water Initiative, Chattanooga, Tennessee.

APPENDIX C-5. PRIME FARMLAND

Table C-5.1 Prime Farmland Soils Found on TVA-Owned Land on Tellico Reservoir

Alcoa Loam	Leadvale Silt Loam
Allegheny Loam	Lindside Silt Loam
Altavista Silt Loam	Lobdell Silt Loam
Barbourville Fine Sandy Loam	Lobelville Cherty Silt Loam
Chagrin Silt Loam	Minvale Silt Loam
Congaree Loam	Neubert Loam
Cumberland Silty Clay Loam	Newark Silt Loam
Decatur Silt Loam	Philo Silt Loam
Decatur Silty Clay Loam	Pope Loam
Dewey Silt Loam	Sequatchie Fine Sandy Loam
Dewey Silty Clay Loam	Sequatchie Loam
Emory Silt Loam	Sequatchie Silt Loam
Emory Silty Clay Loam	Staser Fine Sandy Loam
Etowah Silt Loam	Staser Loam
Greendale Cherty Silt Loam	Staser Silt Loam
Greendale Silt Loam	Statler Loam
Hamblen Silt Loam	Taft Silt Loam
Hermitage Silt Loam	Transylvania Loam
Huntington Loam	Waynesboro Loam
Jefferson Fine Sandy Loam	Whitwell Loam
Landisburg Silt Loam	Wolftever Silt Loam

Table C-5.2	**Tellico Reservoir Land with 10 Acres or More of Prime Farmland Soils**			
Parcel Number	**Units**	**Individual Soil Map Units**	**Acres**	**Total Acres/Parcel**
1	**4**			**189.9**
		Congaree Loam	43.219	
		Emory Silt Loam	6.463	
		Etowah Silt Loam	10.000	
		Huntington Loam	63.597	
		Neubert Loam	1.295	
		Sequatchie Loam	63.602	
		Wolftever Silt Loam	1.695	
35	**2**			**23.5**
		Lindside Silt Loam	23.517	
44/45	**1**			**19.0**
		Alcoa Loam	4.407	
		Hamblen Silt Loam	0.906	
		Neubert Loam	13.659	
46	**1**			**26.5**
		Chagrin Silt Loam	2.778	
		Hamblen Silt Loam	14.956	
		Leadvale Silt Loam	8.806	
61	**1**			**29.2**
		Emory Silt Loam	4.123	
		Etowah Silt Loam	0.815	
		Sequatchie FSL	2.387	
		Sequatchie Loam	9.90	
		Staser FSL	7.20	
		Staser Loam	4.773	
71	**1**			**17.0**
		Hamblen Silt Loam	16.988	
72/78/79	**9**			**416.9**
		Alcoa Loam	7.089	
		Congaree Loam	2.350	
		Etowah Silt Loam	7.022	
		Hamblen Silt Loam	57.109	
		Lobdell Silt Loam	5.332	
		Leadvale Silt Loam	2.050	
		Neubert Loam	3.862	
		Newark Silt Loam	13.882	
		Philo Silt Loam	14.981	

Table C-5.2	**Tellico Reservoir Land with 10 Acres or More of Prime Farmland Soils**			
Parcel Number	**Units**	**Individual Soil Map Units**	**Acres**	**Total Acres/Parcel**
		Pope Loam	4.520	
		Statler Loam	45.987	
		Transylvania Loam	240.069	
		Whitwell Loam	12.564	
73	**3**			**147.6**
		Alcoa Loam	8.393	
		Etowah Silt Loam	115.348	
		Hamblen Silt Loam	10.601	
		Whitwell Loam	13.234	
74	**1**			**16.0**
		Statler Loam	13.364	
		Whitwell Loam	2.591	
90	**1**			**12.0**
		Hamblen Silt Loam	11.912	
112	**1**			**43.0**
		Altavista Silt Loam	8.426	
		Lobdell Silt Loam	23.173	
		Statler Loam	11.387	
113	**1**			**24.1**
		Allegheny Loam	3.50	
		Altavista Silt Loam	2.50	
		Chagrin Silt Loam	4.00	
		Lobdell Silt Loam	2.12	
		Newark Silt Loam	11.968	
125/127	**5**			**106.2**
		Chagrin Silt Loam	26.419	
		Congaree Loam	31.725	
		Hamblen Silt Loam	22.028	
		Staser Loam	18.365	
		Statler Loam	7.652	
126	**4**			**85.1**
		Chagrin Silt Loam	10.840	
		Congaree Loam	19.761	
		Hamblen Silt Loam	14.224	
		Neubert Loam	0.421	

Table C-5.2	**Tellico Reservoir Land with 10 Acres or More of Prime Farmland Soils**			
Parcel Number	**Units**	**Individual Soil Map Units**	**Acres**	**Total Acres/Parcel**
		Sequatchie Loam	4.260	
		Staser Loam	13.912	
		Statler Loam	21.654	
TOTAL ACRES PRIME FARMLAND				**1155.681**

APPENDIX C-6. FLOODPLAINS – FLOOD PROFILES

Table C-6.1 Little Tennessee River - Tellico Reservoir, Flood Profiles

Mile	Bridge	100-Year Flood	Flood Risk Profile	TVA Structure Profile	Landmark
0.46		816.2	817.0	820.0	Tellico Dam
1.00		816.2	817.0	820.0	
2.00		816.2	817.0	820.0	
3.00		816.2	817.0	820.0	
3.68		816.2	817.0	820.0	
4.00		816.2	817.0	820.0	
5.00		816.2	817.0	820.0	
6.00		816.2	817.1	820.0	
6.33		816.2	817.1	820.0	
7.00		816.2	817.1	820.0	
8.00		816.3	817.2	820.0	
9.00		816.3	817.2	820.0	
9.66		816.3	817.2	820.0	
10.00		816.3	817.2	820.0	
11.00		816.3	817.3	820.0	
11.90		816.4	817.3	820.0	Bat Creek
12.00		816.4	817.3	820.0	
13.00		816.4	817.4	820.0	
13.31		816.4	817.4	820.0	
13.65		816.4	817.4	820.0	Baker Creek
14.00		816.4	817.4	820.0	
15.00		816.4	817.5	820.0	
16.00		816.4	817.6	820.0	
16.62		816.4	817.6	820.0	Island Creek
16.64		816.4	817.6	820.0	
17.00		816.4	817.6	820.0	
18.00		816.4	817.6	820.0	
18.59	D	816.4	817.6	820.0	L & N Railroad
18.59	U	816.5	817.7	820.0	
19.00		816.5	817.7	820.0	
19.11	D	816.5	817.7	820.0	U.S. Highway 411
19.11	U	816.5	817.7	820.0	
19.17		816.5	817.7	820.0	Tellico River
19.87		816.5	817.9	820.0	
20.00		816.6	817.9	820.0	
20.07		816.6	817.9	820.0	Ninemile Creek
20.10		816.6	817.9	820.0	
20.82		816.6	818.0	820.0	
21.00		816.6	818.0	820.0	
21.17		816.6	818.0	820.0	
22.00		816.7	818.1	820.0	
22.54		816.7	818.2	820.0	

Table C-6.1 Little Tennessee River - Tellico Reservoir, Flood Profiles					
Mile	**Bridge**	**100-Year Flood**	**Flood Risk Profile**	**TVA Structure Profile**	**Landmark**
23.00		816.7	818.2	820.0	
23.43		816.7	818.2	820.0	Smoky Branch
23.73		816.7	818.2	820.0	
24.00		816.7	818.2	820.0	
24.41		816.7	818.2	820.0	
25.00		816.7	818.2	820.0	
25.74		816.7	818.3	820.0	
26.00		816.7	818.3	820.0	
26.73		816.8	818.4	820.0	
27.00		816.8	818.5	820.0	
27.62		816.9	818.6	820.0	
28.00		817.0	818.7	820.0	
28.60		817.0	818.8	820.0	Fourmile Creek
29.00		817.1	818.9	820.0	
29.68		817.2	819.1	820.0	
30.00		817.4	819.4	820.0	
31.00		818.1	820.3	820.0	
31.02		818.1	820.3	820.0	Citico Creek
31.50		818.4	820.8	820.0 - 821.0	
31.55		818.4	820.8	821.0	
31.80		818.8	821.4	821.0 - 822.0	
32.00		819.1	821.8	822.0	
32.20		819.5	822.3	822.0 - 823.0	
32.34		819.7	822.6	823.0	
32.50		820.1	823.1	823.0 - 824.0	
32.80		820.9	824.1	824.0 - 825.0	
33.00		821.6	824.9	825.0	
33.20		822.0	825.4	825.0 - 826.0	
33.30		822.3	825.7	826.0 - 827.0	
33.40		822.5	826.1	827.0 - 828.0	
33.50		822.8	826.4	828.0 - 829.0	
33.57		823.0	826.6	829.0	Chilhowee Dam

D = Downstream at Bridge
U = Upstream at Bridge

Table C-6.2 Tellico River - Tellico Reservoir, Flood Profiles

Mile		100-Year Flood		Flood Risk Profile		TVA Structure Profile		Landmark
0		816.5		817.7		820.0		
0.34		816.5		817.7		820.0		
1.00		816.5		817.8		820.0		
1.40	D	816.5		817.8		820.0		State Route 360
1.40	U	816.5		817.8		820.0		
1.95		816.7		818.1		820.0		
2.00		816.7		818.1		820.0		
3.00		816.7		818.1		820.0		
3.27		816.7		818.1		820.0		
4.00		816.8		818.2		820.0		
4.20		816.8		818.2		820.0		Corntassel Branch
4.25		816.8		818.2		820.0		
4.36		816.8		818.2		820.0		Notchy Creek
5.00		816.9		818.3		820.0		
5.58		816.9		818.3		820.0		
6.00		816.9		818.4		820.0		
6.20		816.9		818.4		820.0		
7.00		817.0		818.5		820.0		
7.33		817.1		818.6		820.0		
7.66		817.3		818.8		820.0		Ballplay Creek
7.75		817.3		818.9		820.0		
8.00		817.4		819.0		820.0		
8.81		817.6		819.3		820.0		
9.00		817.8		819.5		820.0		
9.10		817.9		819.6		820.0 - 821.0		
9.49		818.2		820.0		821.0		
9.60		818.3		820.1		821.0 - 822.0		
10.00		818.5		820.5		822.0		
10.09		818.5		820.5		822.0		
10.20		818.6		820.6		822.0 - 823.0		
10.80		818.9		821.0		823.0 - 824.0		
11.00		819.0		821.1		824.0		
11.40		819.3		821.4		824.0 - 825.0		
11.61		819.4		821.5		825.0		
12.00		819.7		821.9		825.0		
12.10		819.8		822.0		825.0 - 826.0		
12.66		820.3		822.5		826.0		
12.70		820.4		822.6		826.0 - 827.0		
13.00		820.8		823.0		827.0		
13.40		821.4		823.6		827.0 - 828.0		
13.41		821.4		823.6		828.0		
13.90		821.9		824.2		828.0 - 829.0		

Table C-6.2 Tellico River - Tellico Reservoir, Flood Profiles							
Mile		**100-Year Flood**		**Flood Risk Profile**		**TVA Structure Profile**	**Landmark**
14.00		822.0		824.4		829.0	
14.34		822.4		824.8		829.0	
14.50		822.7		825.2		829.0 - 830.0	
14.79		823.3		825.9		830.0	
15.00		823.4		826.0		830.0 - 831.0	
15.11	D	823.5		826.1		831.0	Ballplay Road
15.11	U	824.2		827.0		831.0	
15.60		825.0		827.8		831.0 - 832.0	
15.85		825.4		828.2		832.0	
16.00		825.8		828.6		832.0	
16.20		826.4		829.2		832.0 - 833.0	
16.75		827.9		830.7		833.0	
16.80		828.1		830.9		833.0 - 834.0	
17.00		828.6		831.5		834.0	
17.20		829.2		832.1		834.0 - 835.0	
17.56		830.3		833.3		835.0	
17.70		830.7		833.7		835.0 - 836.0	
18.00		831.5		834.6		836.0	
18.10		831.8		834.8		836.0 - 837.0	
18.12		831.8		834.9		837.0	Big Creek
18.19		832.0		835.1		837.0	
18.60		832.8		835.9		837.0 - 838.0	
18.83		833.2		836.3		838.0	
19.00		833.7		836.7		838.0 - 839.0	
19.50		835.0		837.9		839.0 - 840.0	
19.62		835.3		838.2		840.0	
19.80		835.9		838.8		840.0 - 841.0	
20.00		836.5		839.5		841.0	
20.22		837.2		840.2			
20.67		838.5		841.6			
21.00		839.5		842.6			
21.05		839.7		842.8			

D = Downstream at Bridge
U = Upstream at Bridge