

STATE OF OKLAHOMA

*UNIFIED WATERSHED ASSESSMENT*

*Final Report*



*Prepared By:*

**OFFICE OF THE SECRETARY OF ENVIRONMENT  
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## INTRODUCTION

On the 25th anniversary of the 1972 Clean Water Act, Vice President Al Gore instructed U.S. Secretary of Agriculture Dan Glickman and U.S. EPA Administrator Carol Browner to develop a Clean Water Action Plan in an effort to establish an implementation schedule for meeting the original goals of the Clean Water Act. One major component of this plan was to foster a new, more cooperative approach to restoring and protecting water quality. This approach, labeled the Unified Watershed Assessment ("UWA"), calls upon state, federal, tribal, and local governments to work with the concerned public to identify watersheds with critical water quality needs and cooperate on implementation strategies to effectively address those needs.

For the State of Oklahoma, the UWA initiative encourages greater coordination among the numerous government agencies concerned with the restoration and protection of Oklahoma's valuable water resources. Led by the Office of the Secretary of Environment and the USDA Natural Resource Conservation Service ("NRCS"), Oklahoma swiftly developed its 1998 assessment with the understanding that the final UWA document would serve *only as a priority-setting tool* for the State to focus any additional federal funds that might arise from the President's FY 1999 Clean Water and Watershed Restoration Budget Initiative. Under the extremely ambitious time frame allowed, Oklahoma chose to rely primarily on existing water quality priority lists to develop its first UWA document.

Because Oklahoma's UWA document was developed with the understanding that it would be used solely for establishing priorities for funding watershed restoration activities, no additional data collection took place, nor did the State verify much of the information used to develop the document. Those involved in the development stages assumed that existing water quality priority lists were valid and accurate due to the opportunity for public/peer scrutiny and/or federal approval of those lists. For this reason, it is important that the reader utilize the UWA document for its intended purpose and not for making assumptions as to Oklahoma's overall watershed health. As the State revises and refines its other water quality priority lists and its UWA process, future UWA documents will provide a more accurate reflection of the true health of our watersheds.

In particular, Oklahoma's environmental agencies have made refining the State's 303(d) list a top priority for the next several years. An extensive water quality monitoring program has been initiated, and the Secretary of Environment has enlisted the assistance of many of the State's environmental agencies in an effort to verify information contained on Oklahoma's existing 303(d) list. As new information reveals necessary revisions to the State's 303(d) list, the State of Oklahoma fully intends to reflect 303(d) list changes in its UWA.

## EXECUTIVE SUMMARY

The Office of the Secretary of Environment ("OSE") and USDA Natural Resources Conservation Service ("NRCS") worked cooperatively on a strategy to develop a UWA for the State of Oklahoma that would include all stakeholders involved in establishing water quality priorities within the state. The process developed by OSE and NRCS was presented for comment to a large water quality stakeholder group in the state, the Oklahoma Water Quality Monitoring Council. With only a few minor comments, the proposed process was adopted and implemented.

First, a small work group was established with representatives from state, federal, tribal, and local governments to perform the majority of the work necessary to assemble Oklahoma's UWA document. This UWA Work Group decided to start with a UWA list based on Oklahoma's 1998 303(d) List of TMDL Priorities. Other water quality priority lists consulted for this process included:

- 305(b) Water Quality Assessment Report
- 319 Nonpoint Source Assessment
- 314 Lake Water Quality Assessment
- USDA-NRCS's priority list for EQIP projects
- U.S. EPA's Index of Watershed Indicators ("IWI")

Using this information, along with several other sources of supporting documentation, Work Group members categorized each of the state's eleven-digit hydrologic unit classification ("HUC-11") watersheds into one of four categories based on the methodology described in the following section. Because the majority of the state's water quality information is available on the HUC-11 scale, and because this scale affords a more accurate reflection of the priority watersheds in Oklahoma, the Work Group decided to develop Oklahoma's UWA document utilizing the HUC-11 format. In an effort to meet the national UWA work group requirements for a nationally consistent watershed classification scheme, Oklahoma's HUC-8 watersheds are also delineated on the enclosed maps. The State of Oklahoma fully intends, however, to utilize the more accurate information presented in the HUC-11 format to prioritize and fund watershed restoration activities.

Oklahoma's UWA document represents the final product of the above mentioned categorization method and ranking exercise. Once assembled, this document was distributed for public review and comment beginning 3 August 1998 by posting the draft document on the Oklahoma Department of Environmental Quality web page. Other stakeholders were encouraged to create links to this online document from their respective web pages, as well. Informational brochures summarizing the UWA process and draft final report were mailed out during the month of August 1998 to established mailing lists notifying the public of the availability of the UWA draft document. Additionally, the UWA document was presented and discussed in an open public forum at the Oklahoma Water Quality Monitoring Council meeting on 25 August 1998.

# METHODOLOGY

## **Determining Percent of Threatened/Impaired Water Bodies**

Through the use of a Geographic Information System ("GIS"), the percent of impaired or threatened water bodies in a watershed can be determined. Oklahoma's 303(d) list of total maximum daily load ("TMDL") priorities (1998 revision) was used as an indicator of impaired/threatened status for the purposes of completing Oklahoma's Unified Watershed Assessment.

The following method was used to determine the percent of impaired or threatened water bodies within a watershed. The 303(d) list, provided by the Oklahoma Department of Environmental Quality, was related to a spatial GIS coverage produced by the Oklahoma Conservation Commission/ Water Quality Programs, which contains stream lengths, lake areas, and Oklahoma water body identification numbers ("WBID") for all water bodies in the state. The U.S. Geological Survey ("USGS") has provided Oklahoma with eleven-digit hydrologic boundaries that define sub-watersheds (HUC-11 watersheds) of larger eight-digit hydrologic units (HUC-8 watersheds). Using the HUC-11 watersheds, the total length of streams and area of lakes listed as threatened or impaired (per Oklahoma's 303(d) list) was determined for each watershed. In addition, the total stream length and lake area was determined for each watershed. From these totals the percent of impaired or threatened water bodies for each HUC-11 watershed was determined for both streams and lakes.

To determine the combined percent of impaired or threatened water bodies for streams and lakes the following method was used. Oklahoma required that lakes and streams have equal value on a statewide basis but be weighted according to their relative proportion in each HUC-11 watershed. To accomplish this, an equivalence factor was determined for area of lakes and length of streams for the entire state. This equivalence factor was 0.028618 meters length of stream per one square meter area of lake. Using this factor, the total lake surface area in each watershed was converted to an equivalent stream length. With this equivalence determined for lakes, the weighted percent of impaired or threatened water bodies was calculated for each watershed. A spreadsheet summarizing the information used in this process is provided in Appendix B.

## **Categorization of Watersheds**

National guidelines for the categorization of watersheds were modified and used in Oklahoma's selection process. The Oklahoma Water Resources Board provided GIS data on state and federal land boundaries in Oklahoma needed for watershed categorization.

### ***Category I -- Watersheds in Need of Restoration***

Category I watersheds are defined as those where clean water and other natural resource goals are impaired or threatened. For Oklahoma, those HUC-11 watersheds with 25% or greater stream miles listed as impaired or threatened (based on the 303(d) list and the percentages calculated as described above) were placed in Category I.

***Category II -- Watersheds Needing Preventive Action to Sustain Water Quality***

Federal guidance states that these watersheds should currently meet clean water and other natural resource goals, but may need preventative action to sustain water quality. Those HUC-11 watersheds that were adequately assessed (i.e., did not meet the criteria for Category IV), yet did not meet the impaired/threatened threshold of 25% for Category I watersheds, were placed in Oklahoma's Category II.

***Category III -- Pristine/Sensitive Watersheds Administered by Government***

UWA guidance reserves Category III for watersheds in pristine condition or with sensitive resource needs where lands are administered by federal, state, or tribal governments. Pristine water bodies were defined as those listed in *Oklahoma's Water Quality Standards* as "Scenic Rivers," "Outstanding Resource Waters," or "High Quality Waters." These watersheds also have less than 25% of stream miles listed as impaired or threatened based on the 303(d) list and impairment percentages as described above. Only two HUC-11 watersheds met Oklahoma's criteria for Category III (e.g., greater than 25% government-owned with "pristine" waters and not meeting the criteria for Category I or IV).

***Category IV -- Watersheds with Insufficient Data***

Watersheds with insufficient data to make an assessment are placed in Category IV. Even though the majority of Oklahoma's watersheds are inadequately monitored for water quality information, Category IV watersheds were chosen using EPA's Index of Watershed Indicators ("IWI"), which showed several watersheds with insufficient data to determine watershed health based on Oklahoma's 1996 305(b) report.

**Ranking Process**

Once Oklahoma's HUC-11 watersheds were appropriately categorized, the Work Group established a ranking system to prioritize watersheds within Category I for implementation purposes. Each watershed in Category I was assigned points based on the criteria described in Table 1. Generally, those watersheds with the most severe water quality problems and the most sensitive resource concerns were given a higher priority.

For the ranking process, the methods used for 303(d) prioritization, EPA's IWI, and Missouri's UWA, in addition to those methods proposed by the Oklahoma Conservation Commission for prioritizing watersheds for nonpoint source pollution control implementation were reviewed. Basically, each of these methodologies addressed three significant categories:

- Severity of threat/impairment
- Impact of threat/impairment on human health and natural resources
- Restoration potential

For each of these categories, it was then determined what information was readily available and how each category should be weighted. To determine the severity of the threat or impairment, the extent and level of the threat or impairment in each HUC-11 was determined. Oklahoma's 303(d) list (1998 revision) contained the most readily available and up-to-date information on water resource concerns; therefore, it was used to calculate the severity of the threat or impairment. The percent of water bodies impaired or threatened was determined using the methods described in the previous section. The seriousness of the threat or impairment

was determined using the length weighted average 303(d) priority. It is hoped that future UWAs will be able to use up-to-date assessment reports to determine the level and extent of water quality concerns.

To determine impact of impairment or threat on human health and other natural resources, the following information was utilized. The number of people provided drinking water from surface water sources within each HUC-11 was determined from the Oklahoma Department of Environmental Quality public water supply database. The U.S. Fish and Wildlife Service ("USFWS") provided a list of priority areas for Federally listed and proposed threatened and endangered species. Protected water bodies were determined from the newly digitized version of *Oklahoma's Water Quality Standards*. The percent change in wetland acreage from 1982-92 was obtained from the USDA Natural Resources Conservation Service's Natural Resource Inventory Database. The USFWS priority wetlands were determined from the acquisition priority table listed in the USFWS Region II Wetlands, Regional Concept Plan.

Ideally, economic and technical feasibility and public interest would be used to determine restoration potential. However, due to the lack of feasibility data, public interest was used to determine the restoration potential of each HUC-11. It was assumed that if local entities or tribes have taken the initiative to develop a fundable Environmental Quality Incentives Program ("EQIP") project and obtain an EQIP priority watershed designation that public interest was high and the potential for restoration was high, as well.

To weight these factors the initial goal was to have the severity of threat/impairment represent at least 50% of the ranking points, impact of threat/impairment represent roughly 30% of the points, and public interest represent approximately 20% of the points. Table 1 outlines the ranking criteria used and the number of points assigned for each criteria. A spreadsheet summarizing the information used in this ranking process, as well as the resulting priorities, is provided in Appendix C.

**Table 1.** Ranking criteria and associated point values used to establish priorities for Category I watersheds in Oklahoma's Unified Watershed Assessment.

RANKING CRITERIA	POINTS					
	20	15	10	5	3	1
<i>Severity (40 points)</i>						
% water bodies on 303(d) list in HUC	>85%	65-85%	45-65%	25-45%		
average 303(d) priority for HUC	<1.5	1.5-2.25	2.25-3.0	3.0-3.75		
<i>Use (28 points)</i>						
# people served (drinking water) in HUC			>100,000	10,000-100,000	1,000-10,000	0-1,000
# Federal threatened/endangered sp.				≥3	2	1
highest designated protected water body				Scenic R./ORW	HQS	SWS
est. decrease in wetlands (1982-92)				>10%	5-10%	0-5%
USFWS priority wetlands present?					Yes	
<i>Public Interest (10 points)</i>						
1998 EQIP priority area present?				Yes		
Tribal EQIP priority area present?				Yes		

# 1998 UNIFIED WATERSHED ASSESSMENT

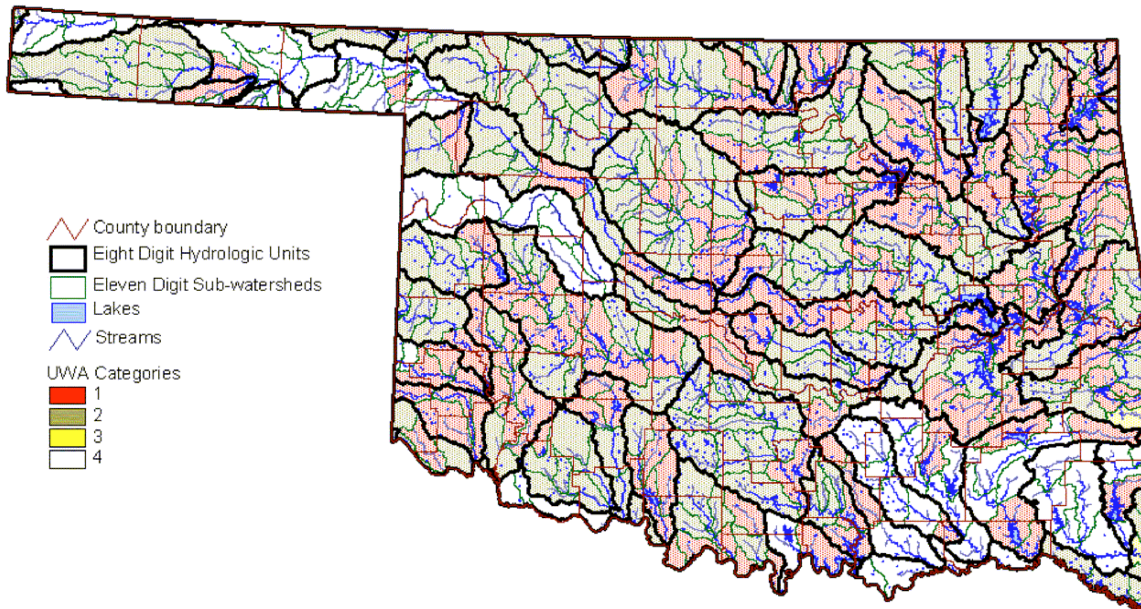
After completing the previously mentioned procedures for identifying and assigning Oklahoma's HUC-11 watersheds into the four UWA categories, the following map was produced. Appendix B contains the raw data and information used to assign a UWA category to each of Oklahoma's HUC-11 watersheds. Appendix A contains enlarged maps of each region of the state showing the UWA information in more detail.

In summary, out of the 402 total HUC-11 watersheds in Oklahoma:

- 150 (or 37%) were designated as Category I watersheds
- 184 (or 46%) were designated as Category II watersheds
- 2 (or 0.5%) were designated as Category III watersheds
- 66 (or 16.5%) were designated as Category IV watersheds

## Oklahoma's Unified Watershed Assessment

Categorized by USGS Eleven Digit Sub-watershed



## APPENDIX A -- DETAILED HUC-11 MAPS

In an effort to provide the reader with more detailed information and more reference points for each HUC-11 watershed, Appendix A contains additional maps of the UWA information. The state was broken into smaller regions so that the watersheds could be enlarged to accommodate the inclusion of information useful to the reader.

*<This appendix is still under construction; additional maps will be included in this appendix and sent to stakeholders (including the regional and national UWA work groups) once they are completed>*

## **APPENDIX B -- HUC-11 RAW DATA**

The spreadsheets contained in Appendix B summarize the data and information used to assess and categorize each HUC-11 watershed. For the benefit of the reader, the spreadsheets are sorted by UWA category, followed by the HUC-11 identification number for each watershed within that category.

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11050002050	78568	26727	34	4.00	300277	0	0		8548	31	4.0	0%			1
11050002080	169717	63151	37	2.29	524783	0	0		14939	34	2.3	0%			1
11050002120	111568	64436	58	4.00	311032	0	0		8854	53	4.0	0%			1
11050002130	337753	179645	53	3.37	14706980	10329142	70	4.00	418676	63	3.7	0%	4		1
11050002160	91643	52286	57	4.00	721776	0	0		20547	47	4.0	0%			1
11050003030	108021	29211	27	2.00	19157755	13699058	72	4.00	545379	64	3.7	0%	4		1
11050003040	151520	67602	45	2.67	2118845	0	0		60319	32	2.7	0%	4		1
11050003050	241822	91827	38	4.00	2310001	1746058	76	3.00	65761	46	3.8	0%	4		1
11050003080	205642	79433	39	3.85	43793671	41132179	94	3.00	1246710	86	3.1	11%			1
11060001030	192137	48293	25	4.00	9764219	9613637	98	4.00	277966	69	4.0	12%			1
11060001040	174506	53125	30	2.75	25230390	24746634	98	4.00	718254	85	3.8	17%			1
11060001050	127633	44685	35	3.57	34208422	30883175	90	4.00	973839	84	4.0	16%	4		1
11060004030	109517	20328	19	3.00	8729040	6457655	74	4.00	248497	57	3.7	20%			1
11060004040	447872	2519	1	3.00	27466671	26582600	97	4.00	781916	62	3.6	11%			1
11060004090	238692	70221	29	3.07	58087	0	0		1654	29	3.1	0%			1
11060004110	398966	120098	30	4.00	286658	0	0		8161	29	4.0	0%			1
11060005080	201514	87376	43	4.00	130712	0	0		3721	43	4.0	0%			1
11060006050	127870	46276	36	4.00	381794	0	0		10869	33	4.0	0%	4		1
11060006070	202230	98696	49	2.10	4476101	1746152	39	2.00	127425	45	2.1	0%	4		1
11060006110	187653	66822	36	2.03	55277555	54569863	99	3.01	1573631	92	2.9	11%			1
11070103050	379985	147046	39	3.63	14175358	3521078	25	2.00	403542	32	2.8	22%	4		1
11070105010	164331	79930	49	3.16	2596831	0	0		73926	34	3.2	0%			1
11070105020	108413	68431	63	1.00	2502927	0	0		71253	38	1.0	0%	4		1
11070105030	277367	115906	42	2.68	3557569	1592924	45	4.00	101276	43	3.0	0%			1
11070106030	138082	15020	11	3.00	12073935	11731906	97	3.00	343719	72	3.0	15%			1
11070106050	143974	32374	22	4.00	12338412	11424534	93	4.00	351248	72	4.0	22%	4		1
11070107010	412897	81699	20	3.49	8837601	3185392	36	4.00	251587	26	3.7	0%	4		1
11070107030	323428	51693	16	4.00	45191272	42225464	93	4.00	1286497	78	4.0	3%	4		1
11070107040	354372	133622	38	2.78	3882739	233400	6	4.00	110533	30	3.1	2%	3		1
11070206020	61256	32980	54	1.00	1363998	846418	62	1.00	38830	57	1.0	0%			1
11070206030	116600	28951	25	1.00	23697209	23519798	99	1.00	674608	88	1.0	0%			1
11070206040	78008	20677	27	3.00	7258474	6922568	95	1.00	206633	77	1.5	0%	3		1
11070206050	76806	47	0	1.00	20914702	19387256	93	1.00	595396	82	1.0	0%			1
11070206060	164870	49151	30	1.00	93191569	92798140	100	1.00	2652960	96	1.0	0%			1
11070207190	131026	31264	24	2.04	1596581	1508760	94	1.00	45451	42	1.8	0%	3		1
11070209020	203335	52440	26	2.00	94564	0	0		2692	25	2.0	0%			1
11070209030	254288	83034	33	3.55	7642882	7175077	94	3.91	217576	61	3.7	0%			1
11070209040	54106	22366	41	1.00	0	0	0		0	41	1.0	0%	4		1
11070209050	74591	2536	3	1.00	3489681	3321404	95	1.00	99344	56	1.0	0%	4		1
11070209060	55567	0	0		16245110	9987803	61	1.68	462463	55	1.7	23%	4		1
11070209070	161312	22232	14	4.00	33547544	30559795	91	4.00	955025	80	4.0	2%	4		1
11070209080	192782	62273	32	3.98	808455	0	0		23015	29	4.0	0%			1
11070209090	84451	37416	44	3.35	3135730	1751763	56	4.00	89267	50	3.7	0%			1
11070209100	292165	83851	29	2.43	5008397	4444833	89	4.00	142578	48	2.9	0%	3		1





HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11130302110	145397	67295	46	1.00	1299487	0	0		36994	37	1.0	0%			1
11130302120	132912	34829	26	3.00	1664178	670252	40	3.00	47376	30	3.0	0%	4		1
11130302130	157735	63953	41	3.00	15925035	15468019	97	3.00	453351	83	3.0	6%	4		1
11130302150	199020	73716	37	1.00	2427839	0	0		69115	27	1.0	0%			1
11130302190	314549	114764	36	2.74	446926	8542	2	4.00	12723	35	2.8	0%			1
11130303130	440987	90534	21	3.00	12375970	9751694	79	4.00	352317	46	3.4	4%	3		1
11130304040	199676	40405	20	3.00	29060559	27824757	96	4.00	827291	81	3.8	19%	3		1
11130304050	247342	46668	19	3.41	71922198	70260149	98	4.00	2047468	89	3.9	2%			1
11140102010	103340	41674	40	2.00	302097	0	0		8600	37	2.0	0%	3	1	1
11140102020	267697	69405	26	2.00	404384	0	0		11512	25	2.0	3%	3	1	1
11140103020	250752	0	0		23751284	21992405	93	3.00	676147	68	3.0	5%	4	1	1
11140104050	136967	51490	38	2.70	268528	0	0		7644	36	2.7	0%		1	1
11140105010	257228	80856	31	4.00	455513	0	0		12967	30	4.0	56%		1	1
11140105030	277483	4817	2	3.01	60027405	58972328	98	4.00	1708849	85	3.9	1%	4	1	1
11140105070	467553	44610	10	3.00	50288106	49635568	99	4.00	1431593	77	3.8	10%		1	1
11140105080	189949	61429	32	3.00	1932377	1083250	56	4.00	55011	38	3.2	0%		1	1
11140108010	18737	4682	25	2.00	0	0	0		0	25	2.0	84%	1	1	1
11140108050	360788	38111	11	2.89	56591900	55153241	97	2.00	1611048	82	2.2	18%	2	1	1
11040001020	16690	0	0		0	0	0		0	0		1%	3		2
11040001040	2610	0	0		0	0	0		0	0		0%			2
11040001050	27997	0	0		0	0	0		0	0		0%			2
11040006020	0	0	0		210023	0	0		5979	0		0%			2
11040006050	1188	0	0		72601	0	0		2067	0		0%			2
11040006060	177482	0	0		479844	0	0		13660	0		0%			2
11040007050	9189	0	0		0	0	0		0	0		0%			2
11040008010	114485	11738	10	4.00	3338255	0	0		95033	6	4.0	0%			2
11040008030	0	0	0		0	0	0		0	0		0%			2
11040008060	145736	1544	1	4.00	230951	0	0		6575	1	4.0	0%			2
11050001010	378237	0	0		194813	0	0		5546	0		0%			2
11050001020	297929	34018	11	4.00	1050940	0	0		29918	10	4.0	0%			2
11050001030	254289	16141	6	3.22	69803	0	0		1987	6	3.2	0%			2
11050001040	277785	18051	6	3.00	433203	0	0		12332	6	3.0	0%			2
11050001050	278295	22427	8	3.00	489526	0	0		13936	8	3.0	0%			2
11050001060	179493	18011	10	4.00	227298	0	0		6471	10	4.0	0%			2
11050001070	494774	0	0		1522009	0	0		43328	0		0%			2
11050001080	203782	7166	4	3.00	228479	0	0		6504	3	3.0	0%			2
11050001090	320515	37964	12	4.00	344674	0	0		9812	11	4.0	0%			2
11050002010	282060	35010	12	4.00	304630	0	0		8672	12	4.0	0%			2
11050002020	198678	71	0	4.00	16962	0	0		483	0	4.0	0%			2
11050002030	316703	213	0	4.00	309263	0	0		8804	0	4.0	1%			2
11050002040	11050002040	94540	19	4.00	62169	0	0		1770	19	4.0	0%			2
11050002060	211179	0	0		119037	0	0		3389	0		0%			2
11050002070	345925	80520	23	2.00	366075	0	0		10421	23	2.0	0%			2
11050002090	326627	0	0		41300	0	0		1176	0		0%			2

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11050002100	201099	0	0		180440	0	0		5137	0		0%			2
11050002110	187373	15733	8	2.00	1488491	108230	7	4.00	42374	8	2.4	0%			2
11050002140	372210	96821	26	3.42	929000	0	0		26447	24	3.4	0%			2
11050002150	253795	32556	13	4.00	843485	0	0		24012	12	4.0	0%			2
11050003010	82738	0	0		188564	0	0		5368	0		0%			2
11050003020	305175	55748	18	4.00	1755769	0	0		49983	16	4.0	0%	4		2
11050003060	89743	0	0		482936	0	0		13748	0		0%			2
11050003070	48157	0	0		47913	0	0		1364	0		2%			2
11060002020	10635	0	0		0	0	0		0	0		0%			2
11060002030	209872	17117	8	3.00	452697	0	0		12887	8	3.0	0%			2
11060002040	328300	65910	20	3.00	1323757	0	0		37684	18	3.0	0%			2
11060003030	317820	30753	10	4.00	401073	0	0		11418	9	4.0	0%			2
11060003040	22805	114	0	4.00	0	0	0		0	0	4.0	0%			2
11060004010	6456	0	0		0	0	0		0	0		0%			2
11060004020	48754	0	0		0	0	0		0	0		0%			2
11060004050	369200	0	0		364284	0	0		10370	0		0%			2
11060004060	306243	25015	8	3.53	859397	490740	57	4.00	24465	12	3.6	1%			2
11060004070	359083	36623	10	4.00	357786	0	0		10185	10	4.0	0%			2
11060004080	560291	0	0		375283	0	0		10683	0		0%			2
11060004100	179021	0	0		41982	0	0		1195	0		0%			2
11060005030	6627	0	0		0	0	0		0	0		0%			2
11060005050	73508	0	0		0	0	0		0	0		0%			2
11060005060	95208	20561	22	4.00	221578	0	0		6308	20	4.0	0%			2
11060005070	156924	37526	24	4.00	44353	0	0		1263	24	4.0	0%			2
11060006010	360125	76975	21	4.00	2121638	0	0		60398	18	4.0	0%			2
11060006020	228198	39121	17	4.00	1018261	0	0		28988	15	4.0	0%			2
11060006030	292341	72638	25	2.00	21125317	0	0		601392	8	2.0	0%			2
11060006040	100035	24413	24	4.00	531299	0	0		15125	21	4.0	1%			2
11060006060	114405	27878	24	4.00	499343	0	0		14215	22	4.0	0%	4		2
11060006080	117322	30856	26	2.00	2098879	0	0		59750	17	2.0	0%			2
11060006090	209044	75301	36	2.00	4164750	0	0		118561	23	2.0	0%	4		2
11060006100	188422	33927	18	2.00	146245	0	0		4163	18	2.0	0%			2
11070103020	2374	0	0		0	0	0		0	0		0%			2
11070103030	373502	40793	11	4.00	931279	0	0		26511	10	4.0	0%			2
11070103040	218863	0	0		328677	6134	2	2.00	9357	0	2.0	1%			2
11070105040	131325	25127	19	4.00	675708	52898	8	4.00	19236	18	4.0	4%			2
11070106010	11787	0	0		76194	0	0		2169	0		0%			2
11070106020	181484	15081	8	3.00	660218	496729	75	3.00	18795	15	3.0	14%			2
11070106060	305719	9051	3	4.00	828537	0	0		23587	3	4.0	2%			2
11070106070	289161	34364	12	2.49	3248990	0	0		92492	9	2.5	0%			2
11070106080	360940	73697	20	3.00	2391224	34262	1	4.00	68073	17	3.2	0%			2
11070107020	139371	0	0		18173	0	0		517	0		0%	4		2
11070205050	0	0	0		0	0	0		0	0		0%			2
11070205060	3298	0	0		0	0	0		0	0		0%			2

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11070206010	263331	32972	13	2.76	1994572	0	0		56781	10	2.8	0%			2
11070208070	62533	0	0		8868927	217392	2	1.00	252479	2	1.0	0%			2
11070208080	3782	0	0		0	0	0		0	0		0%			2
11070209010	306138	29664	10	4.00	865865	0	0		24649	9	4.0	0%			2
11090202010	290283	5277	2	4.00	770128	0	0		21924	2	4.0	0%			2
11090202020	58695	0	0		111437	0	0		3172	0		0%			2
11090202050	113782	22868	20	1.00	267844	0	0		7625	19	1.0	7%			2
11090202060	302799	61028	20	2.35	266359	0	0		7583	20	2.3	3%			2
11090202080	273092	80461	29	3.00	5491126	0	0		156320	19	3.0	0%			2
11090203020	321405	39144	12	4.00	7722701	96	0	4.00	219848	7	4.0	0%			2
11090203030	242117	62773	26	3.00	4250400	0	0		121000	17	3.0	0%			2
11090204040	327145	85652	26	2.00	80662397	5936076	7	4.00	2296282	10	3.8	8%	4		2
11090204050	253312	43600	17	3.00	128539	0	0		3659	17	3.0	0%			2
11100101020	22168	0	0		0	0	0		0	0		0%	3		2
11100101030	2150	0	0		0	0	0		0	0		4%			2
11100101040	74530	0	0		1889900	0	0		53801	0		0%	3		2
11100101050	61754	0	0		2819174	0	0		80256	0		0%	3		2
11100101060	84318	0	0		173792	0	0		4947	0		0%			2
11100101070	65674	0	0		1248090	0	0		35530	0		0%			2
11100101080	128045	0	0		99290	22578	23	4.00	2827	0	4.0	0%			2
11100101090	88	0	0		2154871	0	0		61344	0		0%			2
11100101100	162560	0	0		115529	0	0		3289	0		0%			2
11100203020	345639	32879	10	4.00	108983	0	0		3102	9	4.0	0%	4		2
11100301010	122965	0	0		307325	166484	54	4.00	8749	4	4.0	3%			2
11100301020	72595	0	0		30033	0	0		855	0		0%			2
11100301030	129090	0	0		34364	0	0		978	0		0%			2
11100301040	70077	14526	21	3.00	0	0	0		0	21	3.0	0%			2
11100301060	361933	75607	21	1.16	569235	248414	44	4.00	16205	22	1.3	0%			2
11100302050	298747	8342	3	3.00	7999697	2802352	35	4.00	227734	17	3.4	0%	4		2
11100302060	237901	32886	14	4.00	3255782	0	0		92685	10	4.0	0%			2
11100302080	208494	2368	1	4.00	610984	235555	39	4.00	17393	4	4.0	0%			2
11100303020	167726	4245	3	3.00	2223775	0	0		63306	2	3.0	0%			2
11100303030	39770	0	0		42629	0	0		1214	0		0%			2
11100303040	138226	0	0		1994819	524993	26	4.00	56788	8	4.0	0%	4		2
11100303050	284881	12521	4	4.00	12324129	937085	8	4.00	350841	6	4.0	0%	4		2
11100303060	149219	45397	30	4.00	2205326	0	0		62781	21	4.0	0%			2
11100303070	125260	21343	17	1.00	2184678	0	0		62193	11	1.0	6%			2
11100303100	255351	34607	14	2.02	3045195	0	0		86690	10	2.0	0%			2
11100303110	320303	22600	7	2.00	8476271	0	0		241301	4	2.0	7%	4		2
11100303120	182759	23638	13	4.00	960626	0	0		27347	11	4.0	9%			2
11100303130	243107	78720	32	3.75	69511092	2072839	3	2.02	1978829	6	2.2	14%	4		2
11110101040	265625	42829	16	1.00	633213	0	0		18026	15	1.0	0%			2
11110101050	143088	31908	22	3.00	2198591	130963	6	4.00	62589	17	3.3	0%			2
11110101060	131256	31465	24	2.96	392279	0	0		11167	22	3.0	0%			2

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11110102010	133129	21929	16	4.00	1298060	676585	52	4.00	36953	24	4.0	12%	4		2
11110103080	42858	9114	21	1.00	104497	0	0		2975	20	1.0	0%	2		2
11110103100	118765	19244	16	1.00	5015948	44268	1	1.00	142793	8	1.0	0%			2
11110104010	330068	0	0		4331525	2423001	56	4.00	123309	15	4.0	3%			2
11110104050	152657	27722	18	3.00	1663015	0	0		47342	14	3.0	0%			2
11110104070	165410	0	0		16874	0	0		480	0		0%	1		2
11110104080	29190	0	0		278257	0	0		7921	0		0%			2
11110105040	194623	20117	10	2.00	3208894	0	0		91350	7	2.0	9%	4		2
11110105050	180896	834	0	2.00	365253	0	0		10398	0	2.0	45%			2
11110105080	211093	43471	21	1.00	473652	0	0		13484	19	1.0	0%			2
11110105100	73171	2676	4	1.00	290755	0	0		8277	3	1.0	0%			2
11120105060	18402	0	0		0	0	0		0	0		0%			2
11120302040	64934	0	0		62916	0	0		1791	0		0%			2
11120302050	4535	0	0		0	0	0		0	0		0%			2
11120302060	175668	0	0		171947	0	0		4895	0		0%			2
11120302070	230667	7046	3	3.00	762044	0	0		21694	3	3.0	0%			2
11120303030	55764	17	0	4.00	437932	0	0		12467	0	4.0	0%			2
11120303090	161276	42002	26	3.00	1374897	0	0		39140	21	3.0	0%			2
11130101030	74397	93	0	4.00	98211	0	0		2796	0	4.0	0%			2
11130101050	40764	0	0		53924	0	0		1535	0		0%			2
11130101060	151768	0	0		435018	0	0		12384	0		0%			2
11130101070	36003	0	0		234757	0	0		6683	0		0%			2
11130201010	188342	1467	1	3.00	1058718	0	0		30139	1	3.0	0%			2
11130201040	424189	58916	14	3.00	2205244	0	0		62778	12	3.0	0%			2
11130201050	189201	0	0		126422	0	0		3599	0		0%			2
11130201060	184375	10880	6	3.00	589118	0	0		16771	5	3.0	0%			2
11130201090	217060	31188	14	3.00	882850	0	0		25133	13	3.0	0%			2
11130202040	219389	0	0		1645073	0	0		46832	0		0%			2
11130202050	249526	42143	17	3.00	1022479	639579	63	3.78	29108	22	3.1	0%	4		2
11130203020	184031	0	0		374985	0	0		10675	0		0%			2
11130203030	118857	0	0		1586340	0	0		45160	0		0%			2
11130203040	205451	53950	26	4.00	693528	0	0		19743	24	4.0	6%			2
11130203050	288506	74	0	4.00	693246	0	0		19735	0	4.0	0%			2
11130203060	279300	30729	11	4.00	2554649	564251	22	4.00	72725	13	4.0	21%	3		2
11130203070	291935	63061	22	4.00	709462	0	0		20197	20	4.0	0%			2
11130208010	155423	40022	26	3.00	674601	0	0		19204	23	3.0	0%	4		2
11130301030	191468	10318	5	4.00	1837027	0	0		52296	4	4.0	14%			2
11130301040	283587	15840	6	4.00	3059821	604371	20	4.00	87106	9	4.0	3%			2
11130301050	129478	15670	12	3.00	745425	0	0		21221	10	3.0	0%			2
11130302010	115459	351	0	3.00	1363823	0	0		38825	0	3.0	0%			2
11130302020	110980	0	0		1032946	0	0		29406	0		0%			2
11130302040	115125	0	0		711491	0	0		20255	0		0%			2
11130302070	98352	20089	20	1.00	58698	0	0		1671	20	1.0	0%			2
11130302090	328891	55544	17	3.00	3788004	0	0		107836	13	3.0	1%			2

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11130302100	109005	275	0	1.00	942097	0	0		26819	0	1.0	0%			2
11130302140	214764	27	0	1.00	3233809	0	0		92059	0	1.0	0%			2
11130302160	63907	31101	49	4.00	3413597	0	0		97178	19	4.0	0%			2
11130302170	122671	0	0		223273	0	0		6356	0		0%			2
11130302180	212149	13662	6	4.00	2194827	553448	25	4.00	62482	11	4.0	0%			2
11130303010	233601	15097	6	3.00	2854605	0	0		81264	5	3.0	0%			2
11130303020	244893	0	0		1428984	0	0		40680	0		0%			2
11130303030	76094	0	0		1302793	0	0		37088	0		0%			2
11130303040	95567	0	0		1334601	0	0		37993	0		0%			2
11130303050	98315	0	0		1707928	953780	56	4.00	48621	19	4.0	0%			2
11130303060	242396	12659	5	4.00	5656550	292557	5	4.00	161030	5	4.0	0%	4		2
11130303070	212952	28700	13	4.00	3736361	0	0		106366	9	4.0	0%			2
11130303080	284862	55679	20	4.00	14353477	3975723	28	4.00	408612	24	4.0	0%	4		2
11130303090	206688	34924	17	4.00	1849504	0	0		52651	13	4.0	0%			2
11130303100	206745	50978	25	4.00	1296631	244299	19	4.00	36912	24	4.0	0%			2
11130303110	157280	119	0	3.81	1902612	0	0		54163	0	3.8	0%			2
11130303120	554259	92859	17	2.82	7895800	1593658	20	4.00	224776	18	3.2	0%	4		2
11130304010	123735	253	0	3.00	1134533	0	0		32298	0	3.0	2%			2
11130304020	143367	161	0	3.00	766033	0	0		21807	0	3.0	0%	3		2
11130304030	303689	44624	15	3.00	2060875	0	0		58669	12	3.0	9%	3		2
11140106020	266843	74229	28	2.26	3582044	0	0		101973	20	2.3	0%			2
11140106040	157787	53331	34	3.00	10577527	0	0		301119	12	3.0	40%			2
11140106050	37999	0	0		1235898	0	0		35183	0		75%			2
11140109180	23659	0	0		25375	0	0		722	0		100%			2
11140109190	42970	0	0		0	0	0		0	0		0%			2
11140109200	74591	0	0		80100	0	0		2280	0		0%			2
11110105030	147674	16	0	2.00	368301	0	0		10485	0	2.0	87%	3		3
11140109170	70909	16198	23	2.06	660649	0	0		18807	18	2.1	42%	3		3
11040002010	242936	0	0		644617	0	0		18351	0		0%	3	1	4
11040002020	68192	0	0		84	0	0		2	0		0%		1	4
11040002030	13298	0	0		0	0	0		0	0		0%	3	1	4
11040002040	182118	0	0		208951	0	0		5948	0		0%	3	1	4
11040002050	24597	0	0		20132	0	0		573	0		0%	3	1	4
11040002060	2257	0	0		0	0	0		0	0		0%		1	4
11090103020	0	0	0		0	0	0		0	0		20%		1	4
11090201010	270881	0	0		597521	0	0		17010	0		2%		1	4
11090201020	180533	0	0		288779	0	0		8221	0		7%		1	4
11090201030	235328	0	0		88695	0	0		2525	0		0%		1	4
11090201040	240159	0	0		44620	0	0		1270	0		0%		1	4
11090201050	369334	5416	1	4.00	79830	0	0		2273	1	4.0	0%		1	4
11090201060	502539	110156	22	2.00	201763	0	0		5744	22	2.0	0%		1	4
11090201070	318689	56888	18	4.00	831876	319454	38	4.00	23682	19	4.0	0%		1	4
11100102010	49764	0	0		1522690	0	0		43348	0		0%		1	4
11100102030	28392	2472	9	3.00	303831	0	0		8649	7	3.0	0%		1	4

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11100102040	14389	0	0		2579555	0	0		73434	0		0%		1	4
11100102050	153003	0	0		1426335	0	0		40605	0		0%		1	4
11100102060	193611	0	0		842395	0	0		23981	0		10%		1	4
11100103010	9055	0	0		0	0	0		0	0		0%		1	4
11100103020	33038	0	0		296793	0	0		8449	0		20%		1	4
11100103040	25379	0	0		0	0	0		0	0		0%		1	4
11100104050	24864	0	0		0	0	0		0	0		0%		1	4
11100104060	54391	0	0		189984	0	0		5408	0		0%		1	4
11100104070	67246	0	0		154208	0	0		4390	0		0%		1	4
11100104080	48305	0	0		6243	0	0		178	0		0%		1	4
11100201010	203171	0	0		702234	0	0		19991	0		0%		1	4
11100201020	97127	0	0		459640	0	0		13085	0		0%		1	4
11100201030	204033	0	0		723257	329769	46	4.00	20590	4	4.0	0%		1	4
11100201040	32399	0	0		0	0	0		0	0		0%		1	4
11100201050	188280	23152	12	4.00	19262	0	0		548	12	4.0	0%		1	4
11100201070	94844	0	0		365882	0	0		10416	0		0%		1	4
11100201080	121226	0	0		0	0	0		0	0		0%		1	4
11100201090	121166	89	0	3.00	60907	0	0		1734	0	3.0	5%	4	1	4
11120304020	44755	928	2	3.00	49023	0	0		1396	2	3.0	0%		1	4
11120304030	73629	11617	16	3.00	98352	0	0		2800	15	3.0	17%		1	4
11130102010	113069	0	0		69841	0	0		1988	0		0%		1	4
11130102020	63848	0	0		338689	0	0		9642	0		0%		1	4
11130102030	271086	0	0		207791	0	0		5915	0		1%		1	4
11130210010	435338	106311	24	3.00	26668832	3125248	12	3.00	759203	16	3.0	22%	4	1	4
11140101010	127023	2540	2	4.00	514451	3281	1	4.00	14645	2	4.0	0%		1	4
11140101020	353662	7202	2	1.00	2495980	0	0		71055	2	1.0	0%		1	4
11140101040	229367	225	0	2.00	971876	0	0		27667	0	2.0	0%		1	4
11140101060	229096	134	0	3.00	1536963	0	0		43754	0	3.0	0%		1	4
11140102030	553137	102296	18	1.76	3132423	0	0		89173	16	1.8	0%		1	4
11140103010	359729	0	0		332461	0	0		9464	0		0%		1	4
11140103030	328390	0	0		3083880	1603031	52	3.00	87791	11	3.0	0%	4	1	4
11140103040	259665	77812	30	3.00	21655535	0	0		616486	9	3.0	27%	4	1	4
11140103050	317700	47191	15	3.00	631467	72402	11	4.00	17977	15	3.1	0%	4	1	4
11140103060	309503	41045	13	3.00	398343	0	0		11340	13	3.0	0%		1	4
11140104010	430537	55133	13	3.08	6522299	0	0		185676	9	3.1	0%		1	4
11140104020	197523	0	0		2453990	72127	3	4.00	69860	1	4.0	0%		1	4
11140104030	279470	0	0		4248605	64645	2	4.00	120949	0	4.0	0%		1	4
11140104040	256844	31634	12	3.00	779559	0	0		22192	11	3.0	0%		1	4
11140105020	165676	42544	26	4.00	2206347	0	0		62810	19	4.0	0%	4	1	4
11140105040	379317	3406	1	4.00	466665	0	0		13285	1	4.0	4%	4	1	4
11140105050	261591	0	0		29073	0	0		828	0		10%	3	1	4
11140105060	301772	0	0		1836603	0	0		52284	0		1%	3	1	4
11140107010	368168	0	0		33532	0	0		955	0		0%	3	1	4
11140107020	502457	14815	3	3.00	19229837	0	0		547431	1	3.0	5%	3	1	4

HUC-11	Total Stream Length	Length Listed (303d)	Percent Stream Listed	Mean Stream Priority	Total Lake Area	Total Area Listed	Percent Lake Area Listed	Mean Lake Priority	Stream Equiv.	Total Percent Listed	Total Mean Priority	Percent Federal/State Land	Pristine Waters (1=Scenic, 2=ORW, 3=HQW, 4=SWS)	IWI (1 = not enough info.)	Category Decision
11140107030	176620	20590	12	3.70	170806	0	0		4862	11	3.7	0%	3	1	4
11140107040	492215	53773	11	4.00	0	0	0		0	11	4.0	0%	3	1	4
11140107050	360660	94310	26	2.62	2355463	0	0		67055	22	2.6	28%	3	1	4
11140108030	49037	9045	18	2.00	0	0	0		0	18	2.0	65%	2	1	4
11140108040	262748	61279	23	3.08	111149	0	0		3164	23	3.1	2%	2	1	4
11140108060	117142	19368	17	3.82	1525339	0	0		43423	12	3.8	4%	3	1	4

## **APPENDIX C -- HUC-11 RANKING PRIORITIES**

Appendix C contains the information used to rank each HUC-11 watershed for the purpose of establishing restoration priorities for those watersheds designated as "Category I" in Oklahoma's 1998 Unified Watershed Assessment.

HUC Code	Ranking System									Total Points	Rank	
	Points	Severity		USE				Public Interest				
		% Waters Listed (303d)	Average 303(d) Priority	PWS Population	Endangered Species	Protected Waters	Wetland Percent Change	USFWS Priority Wetlands	1998 EQIP Priority			Tribal EQIP Priority Area
		20	85	1.5								
	15	65	2.25									
	10	45	3	100000								
	5	25	3.75	10000	3	Scenic R./ORW	-10		1	1		
	3			1000	2	HQW	-5	1				
	1			1	1	SWS	0.0					
11110103110	20	20	5	1	3	0	0	5	0	54	1	
11070206060	20	20	3	3	0	0	0	5	0	51	2	
11070209060	10	15	10	3	1	1	0	5	5	50	3	
11070209050	10	20	3	3	1	1	0	5	5	48	4	
11060006110	20	10	3	3	0	0	0	5	5	46	5	
11070206050	15	20	3	3	0	0	0	5	0	46	5	
11110103050	20	10	1	1	5	0	3	5	0	45	7	
11070206040	15	15	3	3	3	0	0	5	0	44	8	
11110103060	5	20	5	1	5	0	3	5	0	44	8	
11140108050	15	15	3	5	5	0	0	0	0	43	10	
11070206030	20	20	0	1	0	0	0	0	0	41	11	
11110105120	15	20	0	1	0	0	0	5	0	41	11	
11110105060	15	15	3	1	0	0	0	5	0	39	13	
11110103090	10	20	1	1	0	0	0	5	0	37	14	
11050003080	20	5	3	3	0	0	0	0	5	36	15	
11070105020	5	20	5	0	1	0	0	5	0	36	15	
11130302030	5	15	5	0	1	0	0	5	5	36	15	
11130302130	15	10	5	0	1	0	0	5	0	36	15	
11070209040	5	20	0	3	1	1	0	5	0	35	19	
11110105110	5	20	3	1	1	0	0	5	0	35	19	
11130301070	20	0	0	0	0	5	0	5	5	35	19	
11130302110	5	20	0	0	0	0	0	5	5	35	19	
11140108010	5	15	0	5	5	0	0	5	0	35	19	
11110101020	5	20	5	3	1	0	0	0	0	34	24	
11120303050	20	5	3	0	1	0	0	0	5	34	24	
11130202020	15	0	10	0	1	3	0	5	0	34	24	
11130202030	15	0	10	0	1	3	0	5	0	34	24	
11070209070	15	0	10	1	1	1	0	0	5	33	28	
11060006070	10	15	3	3	1	0	0	0	0	32	29	
11070106030	15	10	1	1	0	0	0	5	0	32	29	
11140103020	15	10	3	3	1	0	0	0	0	32	29	
11070209100	10	10	1	1	3	1	0	5	0	31	32	
11100302030	5	10	5	0	1	5	0	0	5	31	32	
11130208050	20	0	10	0	1	0	0	0	0	31	32	
11070206020	10	20	0	0	0	0	0	0	0	30	35	
11100301070	5	20	0	0	0	0	0	0	5	30	35	
11100301080	5	15	5	0	0	0	0	0	5	30	35	
11100302040	5	15	0	0	0	5	0	0	5	30	35	
11130302050	5	15	0	0	0	0	0	5	5	30	35	
11130302150	5	20	0	0	0	0	0	5	0	30	35	
11060001050	15	0	5	3	1	0	0	5	0	29	41	
11090203010	15	0	10	3	1	0	0	0	0	29	41	
11060001030	15	0	0	3	0	0	0	5	5	28	43	
11090204020	5	15	0	5	0	0	3	0	0	28	43	
11100302070	10	10	3	0	0	5	0	0	0	28	43	
11050002130	10	5	10	1	1	0	0	0	0	27	46	
11070107030	15	0	5	1	1	0	0	5	0	27	46	
11070209120	20	0	5	1	0	1	0	0	0	27	46	
11110104030	10	0	5	1	0	1	0	5	5	27	46	
11110104040	20	0	0	1	0	1	0	5	0	27	46	
11060001040	15	0	0	1	0	0	0	5	5	26	51	
11060004030	10	5	0	3	0	0	3	5	0	26	51	
11060004040	10	5	0	3	0	0	3	5	0	26	51	

HUC Code	Ranking System									Total Points	Rank	
	Points	Severity		USE					Public Interest			
		% Waters Listed (303d)	Average 303(d) Priority	PWS Population	Endangered Species	Protected Waters	Wetland Percent Change	USFWS Priority Wetlands	1998 EQIP Priority			Tribal EQIP Priority Area
		20	15	10	5	3	1	1	1			1
	85	1.5										
	65	2.25										
	45	3	100000									
	25	3.75	10000	3	Scenic R./ORW	-10		1	1			
			1000	2	HQW	-5	1					
	1		1	1	SWS	0.0						
11100302020	5	10	5	0	1	5	0	0	0	26	51	
11100303010	10	10	5	0	1	0	0	0	0	26	51	
11110102050	5	15	3	3	0	0	0	0	0	26	51	
11110105020	5	15	0	1	0	0	0	5	0	26	51	
11110105070	5	15	0	1	0	0	0	5	0	26	51	
11130210020	20	5	0	1	0	0	0	0	0	26	51	
11130302120	5	10	0	0	1	0	0	5	5	26	51	
11070103050	5	10	10	0	1	0	0	0	0	26	51	
11090204030	5	15	0	5	0	0	0	0	0	25	62	
11090204070	15	0	5	5	0	0	0	0	0	25	62	
11120302080	20	0	0	0	0	0	0	0	5	25	62	
11130302080	5	10	0	0	0	0	0	5	5	25	62	
11050003030	10	5	5	3	1	0	0	0	0	24	66	
11070107040	5	5	10	1	3	0	0	0	0	24	66	
11070207190	5	15	0	0	3	1	0	0	0	24	66	
11090202040	5	15	1	3	0	0	0	0	0	24	66	
11090204010	5	10	3	5	1	0	0	0	0	24	66	
11100302090	15	0	3	1	0	5	0	0	0	24	66	
11100303080	15	5	3	0	1	0	0	0	0	24	66	
11110102070	15	5	1	3	0	0	0	0	0	24	66	
11110105090	5	10	3	1	0	0	0	5	0	24	66	
11130203010	15	0	3	0	0	1	0	5	0	24	66	
11130303130	10	5	5	1	3	0	0	0	0	24	66	
11140102010	5	15	0	1	3	0	0	0	0	24	66	
11070209110	15	0	3	1	3	1	0	0	0	23	78	
11090204080	10	5	3	5	0	0	0	0	0	23	78	
11110102060	10	10	0	3	0	0	0	0	0	23	78	
11140102020	5	15	0	0	3	0	0	0	0	23	78	
11050003050	10	0	3	3	1	0	0	0	5	22	82	
11070209020	5	15	0	1	0	1	0	0	0	22	82	
11090203040	5	5	3	3	1	0	0	0	5	22	82	
11110104020	15	0	0	1	0	1	0	5	0	22	82	
11140105030	15	0	1	5	1	0	0	0	0	22	82	
11060004090	5	5	0	1	0	0	0	5	5	21	87	
11060004110	5	0	0	3	0	0	3	5	5	21	87	
11070105010	5	5	10	1	0	0	0	0	0	21	87	
11090204060	15	0	1	5	0	0	0	0	0	21	87	
11120303080	15	0	5	0	1	0	0	0	0	21	87	
11130304050	20	0	1	0	0	0	0	0	0	21	87	
11140105070	15	0	3	3	0	0	0	0	0	21	87	
11060005080	5	0	3	1	0	1	0	5	5	20	94	
11070107010	5	5	3	1	1	0	0	5	0	20	94	
11070209030	10	5	3	1	0	1	0	0	0	20	94	
11100301050	15	0	0	0	0	0	0	0	5	20	94	
11100302010	5	10	0	0	0	5	0	0	0	20	94	
11120202060	5	15	0	0	0	0	0	0	0	20	94	
11120202070	15	5	0	0	0	0	0	0	0	20	94	
11120304050	10	10	0	0	0	0	0	0	0	20	94	
11130301060	5	0	0	0	0	5	0	5	5	20	94	
11130302190	5	10	0	0	0	0	0	5	0	20	94	
11050003040	5	10	0	3	1	0	0	0	0	19	104	
11070209090	10	5	3	0	0	1	0	0	0	19	104	
11100203030	15	0	3	0	1	0	0	0	0	19	104	

HUC Code	Ranking System									Total Points	Rank	
	Points	Severity		USE				Public Interest				
		% Waters Listed (303d)	Average 303(d) Priority	PWS Population	Endangered Species	Protected Waters	Wetland Percent Change	USFWS Priority Wetlands	1998 EQIP Priority			Tribal EQIP Priority Area
	20	85	1.5									
	15	65	2.25									
	10	45	3	100000								
	5	25	3.75	10000	3	Scenic R./ORW	-10		1	1		
	3			1000	2	HQW	-5	1				
	1			1	1	SWS	0.0					
11110101010		10	0	5	3	1	0	0	0	0	19	104
11070106050		15	0	1	1	1	0	0	0	0	18	108
11110102030		5	10	0	3	0	0	0	0	0	18	108
11130304040		15	0	0	0	3	0	0	0	0	18	108
11140104050		5	10	0	0	0	0	3	0	0	18	108
11100303090		5	5	3	0	1	0	3	0	0	17	112
11110102020		10	0	3	3	1	0	0	0	0	17	112
11050002080		5	10	0	1	0	0	0	0	0	16	114
11070105030		5	5	5	1	0	0	0	0	0	16	114
11120303070		10	5	0	0	1	0	0	0	0	16	114
11130201030		5	10	0	1	0	0	0	0	0	16	114
11130201070		5	10	0	1	0	0	0	0	0	16	114
11130201100		5	10	0	1	0	0	0	0	0	16	114
11130208030		10	5	0	0	1	0	0	0	0	16	114
11060006050		5	0	1	3	1	0	0	5	0	15	121
11100102020		15	0	0	0	0	0	0	0	0	15	121
11100103050		15	0	0	0	0	0	0	0	0	15	121
11120202050		15	0	0	0	0	0	0	0	0	15	121
11120303020		5	0	0	0	0	0	0	5	5	15	121
11120304040		5	10	0	0	0	0	0	0	0	15	121
11120304060		5	10	0	0	0	0	0	0	0	15	121
11130101040		10	0	0	0	0	5	0	0	0	15	121
11130201020		5	10	0	0	0	0	0	0	0	15	121
11130302060		5	0	0	0	0	0	0	5	5	15	121
11140105080		5	5	5	0	0	0	0	0	0	15	121
11050002050		5	0	0	1	0	0	3	0	5	14	132
11050002120		10	0	0	1	0	0	3	0	0	14	132
11130202010		5	0	0	0	1	3	0	5	0	14	132
11090202070		5	5	0	3	0	0	0	0	0	13	135
11110102040		5	5	0	3	0	0	0	0	0	13	135
11130201080		5	5	1	1	0	0	0	0	0	12	137
11050002160		10	0	0	1	0	0	0	0	0	11	138
11100203010		10	0	0	0	1	0	0	0	0	11	138
11110101030		5	0	3	3	0	0	0	0	0	11	138
11130208020		5	5	0	0	1	0	0	0	0	11	138
11120303010		5	5	0	0	0	0	0	0	0	10	142
11120303040		5	0	0	0	0	0	0	0	5	10	142
11130208040		5	5	0	0	0	0	0	0	0	10	142
11140105010		5	0	0	5	0	0	0	0	0	10	142
11090202030		5	0	0	3	0	0	0	0	0	8	146
11070209080		5	0	0	0	0	1	0	0	0	6	147
11100201060		5	0	0	0	0	0	0	0	0	5	148
11120202040		5	0	0	0	0	0	0	0	0	5	148
11120303060		5	0	0	0	0	0	0	0	0	5	148

## APPENDIX D -- COMMENT RESPONSIVENESS SUMMARY

After completing the first draft of Oklahoma's Unified Watershed Assessment ("UWA") on 3 August 1998, the Office of the Secretary of Environment ("OSE") began seeking public comment on the draft UWA document. The Oklahoma Department of Environmental Quality ("DEQ") agreed to post the document on its web page for broad distribution. Additionally, brochures were printed and distributed to mailing lists operated by OSE, DEQ, Oklahoma Water Resources Board ("OWRB"), Oklahoma Conservation Commission ("OCC"), and Oklahoma Corporation Commission. The State of Oklahoma closed its official public comment period for the 1998 UWA at 5:00 P.M. on 10 September 1998.

### COMMENTING ENTITIES (DATE RECEIVED)

- ▶ Woods County Farm Bureau (25 August 1998)
- ▶ Ms. Clara Wichert (26 August 1998)
- ▶ Oklahoma Water Resources Board (9 September 1998)
- ▶ Mr. & Mrs. Donald Barrett (9 September 1998)
- ▶ Environmental Federation of Oklahoma (10 September 1998)
- ▶ Oklahoma Fertilizer and Chemical Association (10 September 1998)
- ▶ Coffin Animal Hospital (10 September 1998)
- ▶ Region 6 UWA Regional Interagency Support Team (10 September 1998)
- ▶ Oklahoma Farm Bureau (10 September 1998)
- ▶ Oklahoma Corporation Commission (10 September 1998)
- ▶ Oklahoma Pork Council (15 September 1998 -- *after comment period deadline*)

### COMMENT SUMMARY/STATE RESPONSE

#### ***Region 6 UWA Regional Interagency Support Team ("RIST") (pertinent comments related to revisions)***

*Comment 1* Oklahoma is "strongly encouraged" to identify those watersheds that will be targeted for funding for FY 1999 and FY 2000.

*Response 1* The State of Oklahoma plans to utilize the ranking table for the watersheds in Category I as its guide for restoration priorities. Oklahoma will start with the top-ranked watershed and work down the rankings until we have identified all of the watersheds that are appropriate for restoration work under the various grant/assistance programs available. Once we have gone through the program development activities for the various grant/assistance programs and finalized our restoration strategies, we will have a better picture of where we hope to target our efforts for FY 1999 and FY 2000. At that point, we will generate a map and list of priority watersheds for FY 1999 and FY 2000 funding.

*Comment 2* Oklahoma is "strongly encouraged" to classify each HUC-8 watershed in only one of the four categories outlined in the national UWA framework. If necessary, Oklahoma may want to designate a subwatershed of a HUC-8 in a different category than the rest of the watershed (just provide rationale and a means to map the subwatershed (e.g., HUC-11 or

HUC-14 format) for such actions)

*Response 2* Because we could not come up with an adequate way to portray Oklahoma's HUC-11 information in the HUC-8 format, Oklahoma decided to submit only HUC-11 information in its final UWA document. In an effort to meet the national UWA work group's need for a consistent method of identifying each state's categories, Oklahoma outlined the HUC-8 watersheds on the map submitted in the final document. From this map, the reader can identify the categories assigned to each HUC-11 watershed, yet still identify the larger HUC-8 watersheds formed by the HUC-11s. This approach allowed Oklahoma to use only the four categories outlined in the national UWA framework.

***Environmental Federation of Oklahoma ("EFO")***

*Comment 1* Believes that relying upon the State's 303(d) list causes the UWA to lose credibility because the 303(d) list is a "flawed document."

*Response 1* Although the credibility of the State's 303(d) list can be argued, the bottom line is that the extremely ambitious deadline given Oklahoma to complete its UWA (approximately six months) caused us to rely on readily available water quality assessments, such as the State's 303(d) list. Furthermore, it only makes sense for the State to rely on available assessments to develop its UWA. It was never intended that the UWA be an independent assessment of the state's water resources. Rather, the national UWA framework calls upon states to merge the numerous other assessments that are already performed into this one, common assessment report (which makes sense and reduces duplicative efforts). The alleged problems with the State's 303(d) list will be investigated through the 303(d) list process, not the UWA process.

*Comment 2* Make sure that the stream segments removed from the 303(d) list in the 1998 revision process are not included in the UWA exercise (including the 60 plus removed by Corporation Commission and the 19 removed by DEQ). Furthermore, make sure that each agency verifies each of its 303(d) list submittals before they are added to the UWA.

*Response 2* The specific stream segments referenced were removed in Oklahoma's 1998 revision of its 303(d) list. Because the UWA was based on the 1998 303(d) list, those removals were subsequently accounted for in this UWA process.

*Comment 3* The UWA should be "reduced to a more realistic and accurate size" as it does not accurately reflect the number of impaired watersheds in Oklahoma.

*Response 3* It is the State of Oklahoma's position that the UWA is not a list of impaired watersheds. The State's position is federally supported by the national UWA framework, in addition to the 14 September 1998 letter from Mr. Richard Hoppers of EPA Region 6 which states, "The purpose of the UWA is not to interpret that a percentage of the State is impaired

because it is identified as a Category I watershed." It is our position that the watersheds listed in Category I of Oklahoma's UWA are those where the State needs to focus its remediation efforts to abate the further degradation of water quality. We fully recognize and admit that the beneficial uses in these watersheds may only be threatened, rather than impaired.

*Comment 4* All HUC-11 watersheds with no ranking points should be excluded from the UWA listing.

*Response 4* The suggested revision was incorporated into the final UWA document.

*Comment 5* The UWA ranking system should be simplified with less weight given to "Average 303(d) Priority" and "% Waters Impaired."

*Response 5* These two categories are actually the most critical to the UWA process because they encompass numerous other parameters. For example, those water bodies with greater public health and environmental concerns typically receive a higher priority for TMDL development, thus a higher 303(d) priority is assigned. Those watersheds with a greater percentage of waters listed on the 303(d) list should also be the watersheds with the greatest environmental threat. Therefore, our consideration of average priority and percentage of waters on the list translates into a consideration of the watersheds with the greatest human health and environmental threat.

*Comment 6* Category I watersheds should be limited to those found on the 303(d) list that are verifiably impaired through some other "reliable" source of information (e.g., Clean Lakes reports, etc.).

*Response 6* It is assumed that all segments verified as not impaired (or not threatened) were removed from the State's 303(d) list during the 1998 revision. Oklahoma's environmental cabinet recognizes that the State's efforts to collect further information for further verification of the listed segments has been inadequate in the past. As the UWA introduction mentions, the State has made it a top priority to improve our knowledge of the health of Oklahoma's watersheds. The new beneficial use monitoring program will go a long way to helping us achieve that goal. Furthermore, it has always been a policy of the State to rely upon other sources of information in creating its 303(d) list. That is why the information contained on the 303(d) list can be easily traced to one or more of the other water quality assessments conducted by State environmental agencies, especially the State's 305(b) report. The majority, if not all, of the 303(d) list information is incorporated into the 305(b) report.

*Comment 7* Category I watersheds should be limited to those that are "truly impaired" and would actually benefit from implementation work; listing too many watersheds may reduce the

amount of money directed to "truly impaired" watersheds.

*Response 7* Because the goal of the UWA is to direct money to those watersheds in need of restoration work, the State will not limit itself only to impaired watersheds. Many threatened watersheds exist in our state where a small amount of money applied to implementing control measures at this stage could translate into major environmental dividends. Therefore, the State will look at its UWA rankings and determine where we can maximize the environmental benefit from dollars spent on restoration efforts. We might find that several of these watersheds are only threatened, rather than impaired. Once we have identified those watersheds where our restoration dollars for FY 1999 and FY 2000 should be spent, we will submit that short list to the interested public, in addition to the national UWA work group (see *RIST Response 1*).

*Comment 8* The UWA introductory section should include a statement such as, "As the 303(d) list is corrected, the UWA rankings will be revised accordingly."

*Response 8* The suggested revision was incorporated into the final UWA document.

*Comment 9* In the description of Category I watersheds (page 5, last sentence), delete the word "known" from the phrase "known impairment," since 303(d) listed segments are not necessarily "impaired."

*Response 9* The suggested revision was incorporated into the final UWA document.

*Comment 10* Because the adequacy of information used for 303(d) listings is in question, the word "adequately" should be removed from the Category II watershed description (page 6, second sentence).

*Response 10* The suggested revision was incorporated into the final UWA document.

*Comment 11* Impaired watersheds having the greatest impact on human health should receive additional weighting in the UWA ranking process; protection of human health should be a higher priority than severity of impairment.

*Response 11* See *EFO Response 5*.

*Comment 12* The function and purpose of the Oklahoma Water Quality Monitoring Council should be better delineated, especially with regard to the Council's role in the UWA process.

*Response 12* Once the membership selection process is completed for the Oklahoma Water Quality Monitoring Council ("Council"), the Secretary of Environment will send each member a letter to more clearly define the role of Council members. In general, the first two Council meetings were held to provide an overview of the Council and to acquaint the general public with the new initiatives coming out of the environmental cabinet. One of these new initiatives is the UWA, and it was presented and discussed at the Council meetings to give the general public an opportunity for input into the process. Because the membership of the Council has not been finalized, OSE never envisioned official action being taken by the Council with regard to the UWA. In fact, there will be numerous environmental initiatives presented at future Council meetings that will require no official action on the part of Council members. In many regards, future Council meetings will serve as open forums to discuss major environmental initiatives related to water quality monitoring and protection. Therefore, the need for official actions of the Council will be necessary only in limited circumstances.

***Oklahoma Farm Bureau ("OFB")***

*Comment 1* Concerned about EPA using our HUC-8 data to suggest that 60% of the state's watersheds are not meeting clean water or other natural resource goals.

*Response 1* The HUC-8 information has been deleted from the final UWA document (see *RIST Response 2*).

*Comment 2* Concerned about our decision to use the 303(d) list as the foundation for the UWA.

*Response 2* See *EFO Responses 1* and *6*.

*Comment 3* Afraid that statements made by Brad Lamb (EPA Region 6) at a previous Nonpoint Source Working Group meeting are an accurate reflection of EPA's intended use of the UWA information. In particular, Mr. Lamb cautioned that Oklahoma's UWA should be a true depiction of the health of the state's watersheds.

*Response 3* See *EFO Response 3*.

*Comment 4* Although the introduction contains a disclaimer that the State's UWA document should only be used to establish priorities for funding watershed restoration, OFB recalls that the State's 303(d) list was started for the same "innocuous" purpose. The State should assume that EPA could use the UWA for some of the same exercises that it is currently using the 303(d) list for (e.g., CAFO general permits for impaired watersheds).

*Response 4* See *EFO Response 3* and *OFB Response 5*.

*Comment 5* Removing watersheds from Category I on the UWA could prove as onerous as trying to remove/partially remove stream segments from the State's 303(d) list.

*Response 5* In reviewing the national UWA framework, in addition to numerous conversations with EPA and NRCS staff, this is not a concern. Oklahoma's UWA is not officially approved/disapproved by any state or federal entity, nor is it promulgated as an official state or federal regulation. The UWA is a product of the State of Oklahoma, and, as such, the State has the freedom to revise its document at will. Therefore, the State may move watersheds between the four UWA categories whenever it chooses as more information becomes available to warrant such revisions.

*Comment 6* The UWA may be used to carry out some of the provisions of the soon-to-be-released Animal Feeding Operation ("AFO") Strategy recently drafted by EPA/NRCS. Specifically, the UWA may be used to delineate "vulnerable" watersheds needing alternative manure disposal requirements and "watersheds identified as not meeting clean water goals" where more stringent watershed permits would be required for AFOs.

*Response 6* See *EFO Response 3* and *OFB Response 5*. The State of Oklahoma is not as concerned about the UWA being misused for regulatory purposes as it is concerned about the misuses of the State's 303(d) list. Because of the way in which information is organized on the 303(d) list, it is possible to make inferences (albeit unreasonable) as to the sources that are threatening or impairing beneficial uses. The UWA, on the other hand, makes no distinctions about the causes or sources of water quality degradation in each Category I watershed. Therefore, it would be illogical for a regulatory agency to mandate certain control practices in an effort to restore water quality based solely on a document that does not even reference the practices that are causing water quality degradation.

*Comment 7* Category I should contain only those watersheds with publicly available data to verify that they meet Oklahoma's "legal" definition of impaired. Otherwise, the UWA work group will repeat the same mistakes made on Oklahoma's 303(d) list, and the state's waters will be portrayed with "unwarranted negative images."

*Response 7* See *EFO Responses 1, 3, 6, and 7*.

***Oklahoma Corporation Commission ("Corp Comm")***

*Comment 1* Lake Oologah (HUC# 11070103050) should be recategorized as Category I due to recent information obtained by Corp Comm that shows shallow oilfield wells to be impacting greater than 30% of the watershed (see Corp Comm memo for further details).

*Response 1* The suggested revision was incorporated into the final UWA document. According to Corp Comm, recent information and field surveys (too recent for inclusion on the 1998 revision of the State's 303(d) list) proved that several stream and lake segments were impaired or threatened due to unplugged, seeping shallow wells in the Lake Oologah watershed. A review of the State's 303(d) list revealed that several of these segments were not already found on the 303(d) list and, thus, were not included in the first round of UWA calculations. The incorporation of these additional segments into the stream miles impaired/threatened for HUC #11070103050 caused this watershed to meet the minimum criteria for a Category I watershed. Because no numerical standards exist for petroleum hydrocarbons in *Oklahoma's Water Quality Standards ("WQS")*, and because the presence of visible sheen on the water's surface is an accepted method for assessing petroleum hydrocarbon impacts, the State relied upon the best professional judgement of Corp Comm in determining that the additional segments were threatened, if not impaired.

*Comment 2* A statement explaining the intent of the State to conduct extensive water quality monitoring and to undergo major revisions to the 303(d) list should be added to the introduction.

*Response 2* The suggested revision was incorporated into the final UWA document.

*Comment 3* If HUC-8 data must be submitted, place the information in the last appendix, rather than the first appendix.

*Response 3* See *RIST Response 2*.

**Oklahoma Water Resources Board**

*Comment 1* OWRB recommended the following minor revisions to the UWA document:

- page 3, paragraph 2, line 5 -- add bold-type and underline to "only as a priority-setting tool"
- page 3, paragraph 2, line 7 -- replace "timeframe" with "time frame"
- page 4, paragraph 2, line 4 -- capitalize the "B" on "bodies"
- page 5, paragraph 2, line 4 -- add the word "number" after "water body identification"
- page 6, paragraph 5, sentence 1 -- rephrase sentence to make it more understandable
- page 7, paragraph 1, line 3 -- delete "305(b) and 319" and leave it as "assessment reports"
- page A-1, paragraph 1, line 7 -- add "as Oklahoma believes the HUC-8 information is a misrepresentation of the state's true water quality" to the end of the sentence

*Response 1* The suggested revisions were incorporated into the final UWA document.

**Woods County Farm Bureau**

*Comment 1* UWA document contains an excessive number of "impaired" streams, and the work group should submit a more "realistic" list. Category I watersheds in Woods County appear to be clean with no known chemical or biological impairments; the group fears excessive regulatory burdens in the near future due to streams being listed as impaired.

*Response 1* See *EFO Responses 3, 6 and 7* and *OFB Response 6*. Although the majority of the waters in Woods County may look "clean" with no known chemical or biological impairments, greater than 25% of the stream and lake miles in your county are found on the State's 303(d) list due to some water quality concern. If you have information to prove that the listed streams and lakes in your county are not truly impaired or threatened, that information should be made available to the Office of the Secretary of Environment in time for its 2000 revision of the 303(d) list. Otherwise, the State's environmental agencies will have to review the historical information used to list the Woods County water bodies and/or conduct further monitoring of those water bodies to verify their water quality condition. The State looks forward to working with your group in the months and years ahead in our cooperative efforts to refine Oklahoma's 303(d) list.

**Ms. Clara Wichert, Fairview, Oklahoma**

*Comment 1* Concerned about the extent of impaired watersheds as reflected by the UWA and worried about undue regulations on her farming operation.

*Response 1* See *EFO Responses 3, 6 and 7* and *OFB Response 6*.

**Mr. & Mrs. Donald Barrett, Broiler Producers Council of Oklahoma**

*Comment 1* Concerned that the UWA used inadequate data in classifying some of the watersheds, and they don't want to see more blame placed on the agriculture industry.

*Response 1* See *EFO Responses 6 and 7* and *OFB Response 6*.

**Coffin Animal Hospital, Idabel, Oklahoma**

*Comment 1* Concerned that the use of the State's 303(d) list for this purpose makes the UWA fictitious; the State is being bribed into making false statements about the health of Oklahoma's water resources in order to get additional federal dollars.

*Response 1* See *EFO Responses 1, 3, 6 and 7* and *OFB Responses 5 and 6*.

**Oklahoma Fertilizer and Chemical Association**

*Comment 1* Same as *EFO Comment 1* (see *EFO Response 1*)

*Comment 2* Same as *EFO Comment 2* (see *EFO Response 2*)

*Comment 3* Same as *EFO Comment 4* (see *EFO Response 4*)

*Comment 4* Same as *EFO Comments 6 and 7* (see *EFO Responses 6 and 7*)

*Comment 5* Same as *EFO Comment 11* (see *EFO Response 11*)