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# TALU Development & Implementation in Other Regions: Active Case Examples


Region I States Bioassessment Programs  
2010 NEAEB Conference  
March 17, 2010

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Table 1. Status of 22 state bioassessment and TALU program evaluations conducted since 2001. A full evaluation includes a review of the monitoring and assessment (M&A), water quality standards (WQS), and major water quality management programs as each pertains to designated aquatic life uses. A critical technical elements evaluation was conducted at a minimum during each onsite visit. Major assemblages for lotic ecotypes in parenthesis (F = fish; M = macroinvertebrates; P = periphyton).

State	No. of Visits	Most Recent Evaluation	Full Program Review	Critical Technical Elements	Technical Memorandum	EPA Region Involved?	CE Score/ %	CE Level	TALU Development Status Remarks
Alabama (M)	1	4/11/2006	No	Yes	4-20-2006	NO	51 [85%]	3-	No follow-up assessment; current program status is unknown.
Arizona (M)	1	8/1-2/2006	Yes	Yes	9-2-2006	NO	44.5 [74%]	2	No follow-up assessment; current program status is unknown.
California (M/P)	1	1/23-24/2008	Yes	Yes	4-25-2008; 4-15-2009	YES	53 [88.3%]	3+	CA used original technical memorandum to produce their own assessment aimed at convincing SWRCB to initiate TALU development & adoption; process is underway.
Connecticut (F/M)	1	10/31-11/2/2006	Yes	Yes	3-7-2007	YES [grant funded]	45 [75%]	2	Follow-up via 2 Region I workshops at annual NEAEB conference; CTDEP is pursuing TALU development at present; WQS rule proposal.
Colorado (M)	1	12/5-6/2007	Yes	Yes	2-6-2007	YES	45 [75%]	2	One brief follow-up in 2008; CODPHE is in process of adopting biocriteria.
Florida (M/P)	1	4/29-30/2009	No	Yes	7-31-2009	NO	54 [90%]	3+	Abbreviated technical memo on 7/31/2009; TALU development is being discussed & WQS proposal is imminent.
Illinois (F/M)	3	5/3-4/2006	Yes	Yes	Region V Report	YES	46.5 [77.5%]	2	TALU development initiated by Illinois Association of Wastewater Agencies (IAWA); IEPA is part of stakeholder group and is providing technical assistance; IAWA intends to propose rules by end of 2009.

# State TALU Status

<i>CE Level</i>	<i>TALU<sup>1</sup></i>	<i>In Development</i>	<i>None</i>
<i>Level 4 [2]</i>	<i>2</i>	<i>-</i>	<i>-</i>
<i>Level 3+ [3]</i>	<i>-</i>	 <i>3</i>	<i>-</i>
<i>Level 3 [5]</i>	<i>-</i>	<i>3</i>	<i>2</i>
<i>Level 2 [11]</i>	<i>-</i>	<i>-</i>	<i>11</i>
<i>Level 1 [1]</i>	<i>-</i>	<i>-</i>	<i>1</i>
<i>Totals [22]</i>	<i>2</i>	<i>6</i>	<i>14</i>


*1 - Biologically based TALUs only.*

*9/29/2009*

# Adoption of Biologically Based Standards and Tiered Aquatic Life Uses in Minnesota

External stakeholder discussions for  
implementation plan development

February 24-26, 2009

The background of the slide is a solid blue color. In the lower right quadrant, there are several concentric white circles of varying sizes, resembling ripples on water. These ripples are positioned in the bottom right corner and extend towards the center of the slide.

# Major Parts of a TALU Based Program

- The TALU based approach includes tiered aquatic life uses (TALU) based on numeric biological criteria and indicators in WQS.
- Implementation is via an adequate ambient monitoring and assessment program that includes biological, chemical, and physical measures, parameters, indicators and a process for stressor & source identification.
- Bioassessment produces the justification for WQS revisions before management actions are taken.

**These comprise the TALU Process.**

# Minnesota ch. 7050 Water Use Classifications

Class 1 Drinking waters

## **Class 2 Aquatic Life and Recreation**

**Class 2A Coldwater (designation by Minnesota DNR)**

**Class 2Bd Warmwater (same as 2B and also used for public water supply)**

**Class 2B Warmwater (streams suitable for game fish, default classification)**

**Class 2C (Usually small streams with limited habitat for gamefish populations)**

Class 2D Wetlands

Class 3 Industrial consumption

Class 4 Agriculture and wildlife

Class 5 Aesthetic Enjoyment and navigation

Class 6 other uses

**Class 7 Limited Resource value waters (Approved by USEPA in 1981, streams assigned through completion of UAA)**

# How Are TALU-Based CWA Programs Different?

## Non-TALU CWA Program

### Characteristics:

1. Manages to minimum CWA
- 2.
- 3.
- 4.
5. priorities
6. Point source policy emphasis
7. Can lead to inconsistencies between states

## Full TALU Program

### Characteristics:

1. Manages to highest attainable
- 2.
- 3.
- 4.
5. priorities
6. Policies responsive to all sources
7. Consistency governed by BCG baseline

*TALU makes WQ management outcomes more accurate, equitable, and visible.*

# The Biological Condition Gradient: Biological Response to Increasing Levels of Stress

## Levels of Biological Condition

Natural structural, functional, and taxonomic integrity is preserved.

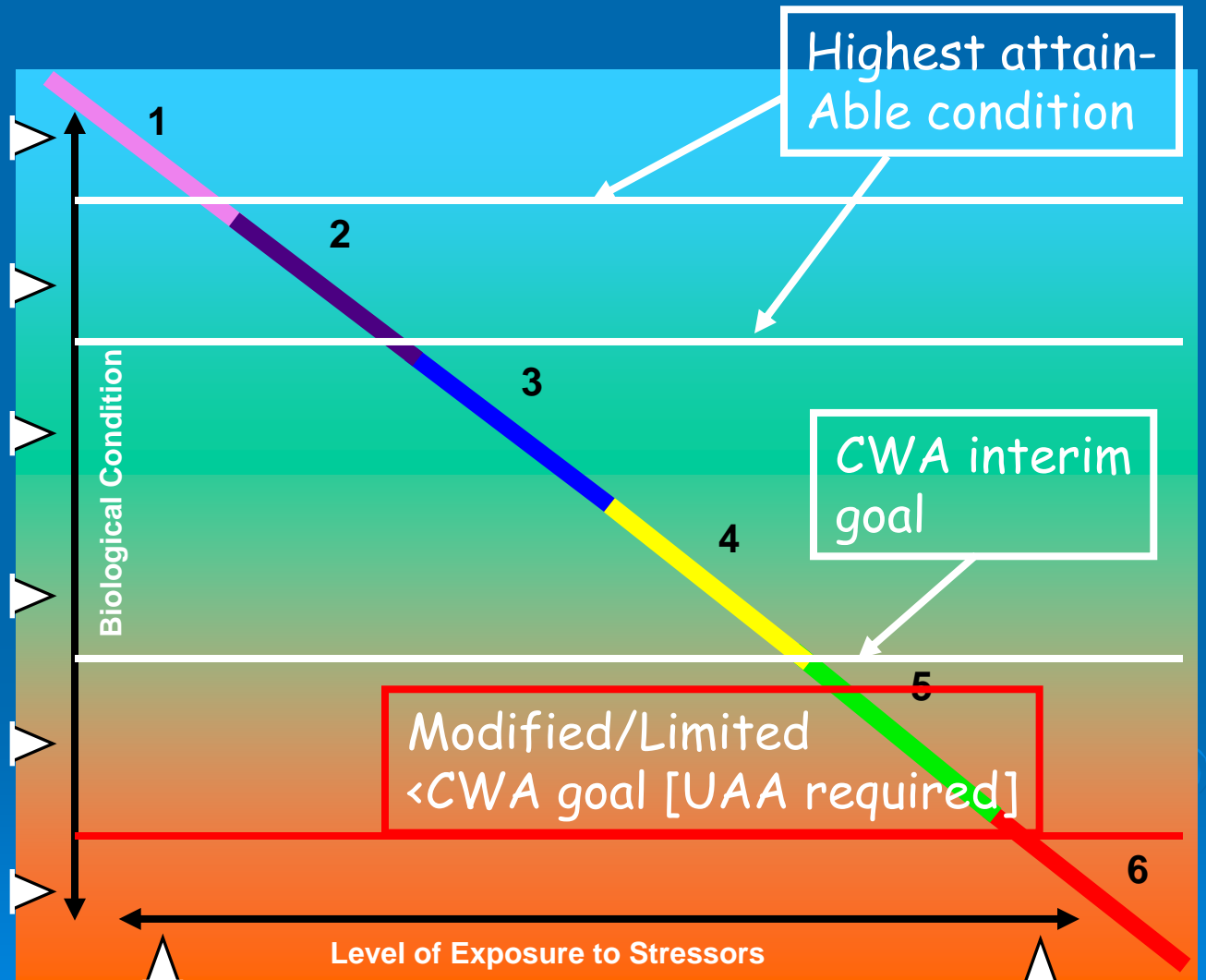
Structure & function similar to natural community with some additional taxa & biomass; ecosystem level functions are fully maintained.

Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance; ecosystem level functions fully maintained.

Moderate changes in structure due to replacement of sensitive ubiquitous taxa by more tolerant taxa; ecosystem functions largely maintained.

Sensitive taxa markedly diminished; conspicuously unbalanced distribution of major taxonomic groups; ecosystem function shows reduced complexity & redundancy.

Extreme changes in structure and ecosystem function; wholesale changes in taxonomic composition; extreme alterations from normal densities.



Watershed, habitat, flow regime and water chemistry as naturally occurs.

Chemistry, habitat, and/or flow regime severely altered from natural conditions.

# Outstanding Resource Value Waters (ORVW)

More stringent controls on new or expanded discharges  
Prohibited ORVW - no discharges,  
Restricted ORVW's-Non degradation review required

Usually other designations apply (e.g. National Wild and Scenic Riverway,  
Waters in BWCA, Voyageurs Park, MDNR designated scientific and natural areas)

Examples include: St. Croix River, portions of Rum, Kettle and Upper Mississippi  
Rivers,  
Lake Superior, calcareous fens



# Class 7 Waters

Almost all are small channelized reaches

All class 7 waters have point source discharges

No acute toxicity standards, protected for secondary body contact

Must meet all 2b standards at end of reach

Most are considered to be intermittent streams

Approximately 1000 miles of Class 7 waters  
(out of approximately 92,000 stream miles)

MDNR requested to provide biological data-usually very limited information

Increasingly controversial



PCA is developing a more refined approach to designated uses known as tiered uses (TALUs).

The Ohio model seems to be the best fit for Minnesota given the history of using the IBI as our primary assessment tool, the range of conditions within the state, and the prevalence of hydrologically altered channels. For example:

### Current MPCA Classes

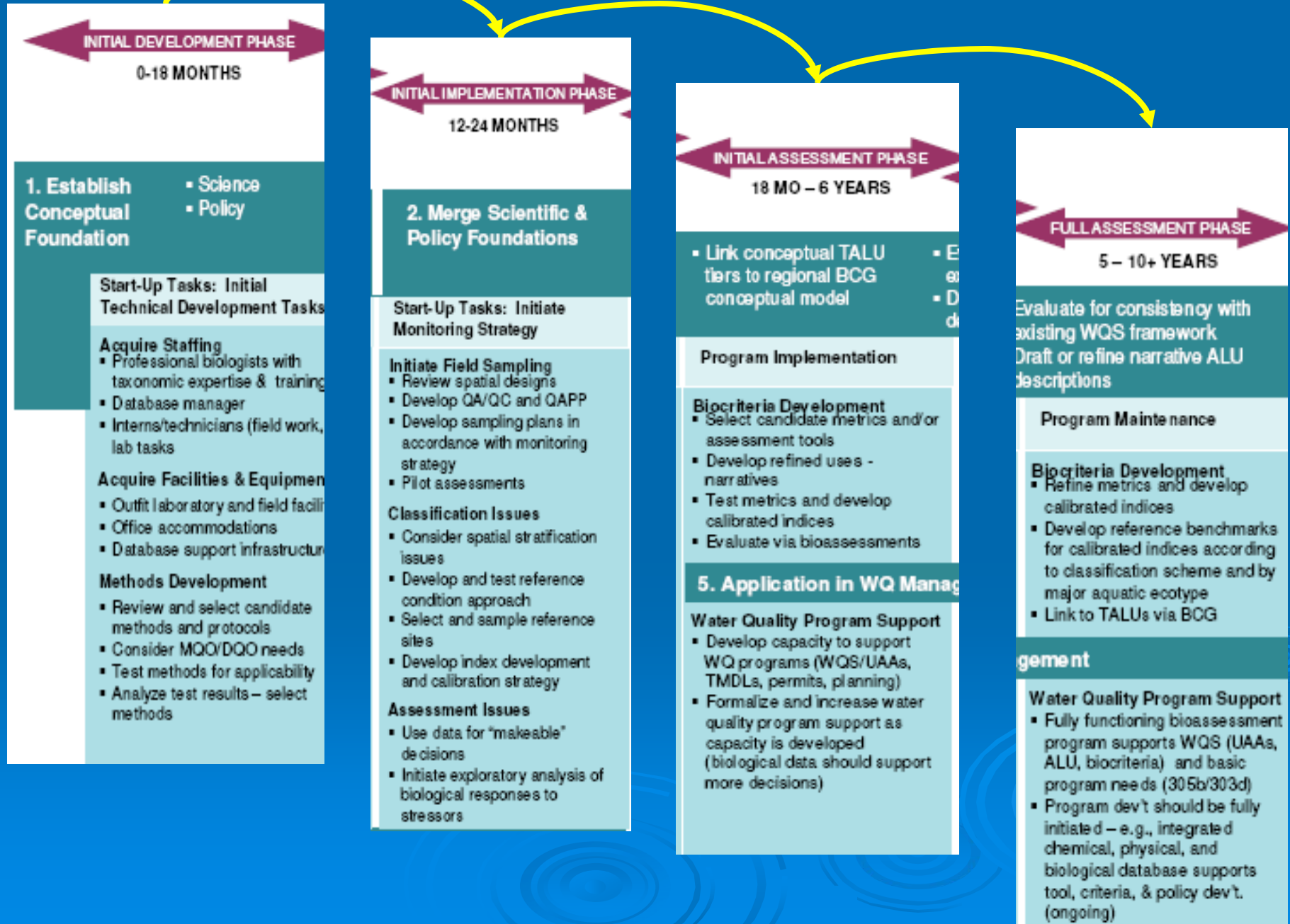
<b>No Current WQS Class</b>	{	Exceptional warmwater streams: (Best in each stream class, exceed CWA interim Goal, meet or nearly meet the overall goal of the act)
<b>Class 2A&amp;B</b>	{	Warmwater/Coldwater streams: (Meet Interim CWA goal, default use)
<b>Class 7 is inadequate</b>	{	Modified warmwater streams: (irretrievably altered habitat, do not meet CWA interim goal)
	{	Limited warmwater streams? (very little biological potential due to physical constraints).



# TALU Based Use Designation Options

Current Class	M&A Result	Status	Options & Next Steps
2B	2B	Attains	Maintain use via WQM
2B	E2B	Attains	Upgrade use to E2B
2B	<2B	Impaired	UAA - assess attainability of 2B; TMDL or change use (M2B)
7	2B	Attains	UAA - upgrade to 2B
7	<2B	Attains?	UAA - assess attainability of 2B; change to M2B or upgrade to 2B based on UAA.

# Minnesota's TALU Timeline Status



# How do we move towards TALU??

## Tiered Aquatic Life Uses Timeline (Technical milestones)

- |   |           |
|---|-----------|
| 1. Regional framework analysis                  | 2008      |
| 2. Data gap analysis                            | 2006-2010 |
| 3. Development of biological condition gradient | Fall 2009 |
| 4. Statewide IBI Development                    | 2009-10   |
| 5. Tiered aquatic life use development          | 2010-11   |
| 6. TALU Implementation Plan                     | 2010-11   |
| 7. Impaired Waters Listing Process              | 2010-11   |
| 8. Administrative Rule Process                  | 2011-2012 |

A man wearing a wide-brimmed hat, a light-colored tank top, and shorts is sitting on a stationary bike on a bridge. The bridge has a sign that says "CLARK STREET". In the background, there is a dense urban skyline with several tall buildings, including a prominent one with a rounded, tiered top. The sky is blue with some light clouds. The text "The Illinois TALU Project: Developing TALUs in a Highly Modified Landscape" is overlaid in large, yellow, bold letters across the center of the image.

# The Illinois TALU Project: Developing TALUs in a Highly Modified Landscape

# Illinois TALU Impetus

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*Illinois Association of Wastewater Agencies (IAWA) Requested Assistance With:*

- Establishing designated aquatic life use tiers including classes and subclasses.
- Determining the biological, chemical, and physical characteristics of the various designated use tiers.
- Illinois EPA is a major stakeholder.

# Incorporating TALU into WQS

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*There is no guidance or "book" about*

- *Current WQS "technology" is 30 years out of date - we need a new "book".*

attributes of designated use narratives compared to general & fishery based uses.

- We need to be explicit about implementation.

# Designated Use Narrative: Key Attributes

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*The use narrative should include the following:*

- Definitive goal statement.
- Quantitative thresholds.
- Geographic applicability.
- How attainment is measured.
- Methods document references.
- Any applicability exceptions.

# TALU in WQS: II

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## *Implementation Language Should:*

- Define the role of biocriteria in WQS.
- State the data requirements.
- State options for a finding of full attainment.
- State options for a finding of non-attainment.
- This is separate from the designated use narrative.

# Proposed Illinois TALU Tiers



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- Exceptional Warmwater Habitat.
  - General Warmwater Habitat.
  - Modified Warmwater Habitat.
  - Limited Resource Waters.
- 

# Proposed TALU Language

“Exceptional Warmwater” - these are waters capable of supporting and maintaining an exceptional and unusual balanced, integrated, adaptive community of warmwater aquatic organisms having a species composition, diversity, and functional organization comparable to the seventy-fifth percentile of the regional reference condition. For all regions, the attributes of species composition, diversity, and functional organization will be measured using the fish based Index of Biotic Integrity as defined in “Draft Manual for Calculating Index of Biotic Integrity Scores for Streams in Illinois (annotated 2006)” and the macroinvertebrate Stream Condition Index as defined in “Illinois benthic macroinvertebrate collection method comparison and stream condition index revision (revised March 2007)” as cited in [reference to analytical methods part of Illinois WQS goes here]. Attainment of this use designation (except for upground storage reservoirs) is based on the criteria in [refers to table of IBI and SCI values in WQS] of this rule. [additional language about variances or exceptions can be added here].

Table 3-1. Percentile distribution of Illinois fish IBI and macroinvertebrate SCI scores at least impacted reference sites. Recommended biocriteria for the General Warmwater use are in boldface and are underlined for the Exceptional use.

Percentile	Fish IBI Score: Range = 0-60 (N = 164)	Macroinvertebrate SCI: Range = 0-100 (N = 51)
99	58.4	84.9
95	57.0	79.8
90	56.0	77.6
75	 <u>54.0</u>	<u>73.2</u>
50	50.5	64.9
25	 45.8	52.7
20	45.0	49.6
15	42.0	48.7
10	40.3	44.5
5	38.0	34.1
1	31.3	21.3

# Application Language in WQS: I

“The numeric biological criteria presented in [reference the specific table of numbers] of this rule provide a direct measure of attainment of the exceptional warmwater habitat, warmwater habitat, modified warmwater habitat, and limited resource waters aquatic life uses. Biological criteria and the exceptions to chemical-specific or whole-effluent criteria allowed by this paragraph do not apply to any other use designations. Illinois EPA will take a “weight-of-evidence” approach to the resolution of differences between the numeric biological criteria, chemical-specific criteria, and/or whole effluent toxicity criteria and their application to specific water quality management issues and programs. This means that the strength of the evidence conveyed by each will be considered in making decisions about how the Illinois EPA water quality management programs will react to findings of attainment and non-attainment as follows:

- A. Demonstrated attainment of the applicable numeric biological criteria in a water body will generally take precedence over the application of selected chemical-specific aquatic life or whole-effluent criteria associated with these uses when the [agency or its executing officer], upon considering appropriately detailed chemical, physical and biological data, finds that one or more chemical-specific or whole-effluent criteria are exceeded. In such cases the options which exist include:

# Application Language in WQS: III

B. Demonstrated non-attainment of the applicable biological criteria in a water body with concomitant evidence that the associated chemical-specific aquatic life criteria and whole-effluent criteria are met will cause the [agency or its executing officer] to seek and establish, the cause of the nonattainment of the designated use. The [agency or its executing officer] shall first evaluate the existing designated use and, where not attainable, propose to change the designated use following sound use attainability analysis (UAA) practices and with sufficient data and information to assure a credible outcome. Where the designated use is found to be attainable and the cause of the non-attainment can be identified, the [agency or its executing officer] shall, wherever necessary and appropriate, implement regulatory controls or make other recommendations regarding water resource management to restore the designated use. This can be executed by a permitting action, a TMDL, a watershed management plan, or some other such action or strategy that is developed to resolve the non-attainment. Additional follow-up studies will be undertaken to resolve any uncertainties regarding the cause(s) of the non-attainment. The [agency or its executing officer] will seek to establish the cause(s) as an alternative to listing such impairments as undetermined.

# TALU Implementation

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## *The "Correct" Order of Primary Tasks*

- Assigning the appropriate and attainable use tier to a waterbody (and any segments).
- Determination of status.
- Translating the above into implementable water quality management responses.

Table 4-1. Tiered aquatic life use options based on evaluation of default uses currently in the Illinois WQS and under a new system of tiered aquatic life uses (TALUs).

Current Designated Aquatic Life Use	Monitoring Results	Attains Designated Use?	Management options under new TALU based approach
GWH <sup>4</sup>	GWH Attainment (IBI>46,<54; MIBI>53,<73)	YES	Retain GWH designation because biocriteria demonstrate attainability.
GWH	GWH Non-attainment (IBI<46, MIBI<73)	NO	If habitat assessment indicates GWH is attainable, then retain GWH use; OR If habitat is impaired & due to 40CFR131[g] factors, change use to MWH
GWH	EWH Attainment (IBI>54 AND MIBI>73)	YES	Revise use to EWH based on attainment of EWH biocriteria by both assemblages.
SC/IA <sup>5</sup>	GWH Attainment (IBI>46,<54; MIBI>53,<73)	YES	Revise use to GWH based on attainment of GWH biocriteria by both assemblages.
SC/IA	GWH Non-attainment (IBI<46, MIBI<73)	?	If habitat assessment indicates GWH is attainable, then retain GWH use; OR If habitat is impaired & due to 40CFR131[g] factors, change use to MWH or LRW.

<sup>4</sup> GWH - General Warmwater Habitat use designation.

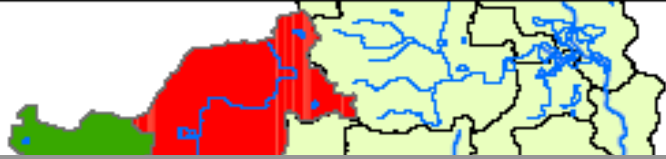
<sup>5</sup> SC/IA - Secondary Contact Indigenous Aquatic Life use designation.

# What Else Can a TALU Process Help Deliver to WQ Management?

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- Refined physical and chemical management endpoints (e.g., habitat, nutrients, non-traditional parameters)
- A mechanism for validating new and/or revised water quality criteria (e.g., D.O., NH<sub>3</sub>-N, dissolved metals)
- Stratification of policy applications (minor POTW, 401 reviews)

# Watershed Coverage of TMDLs W.B. DuPage River



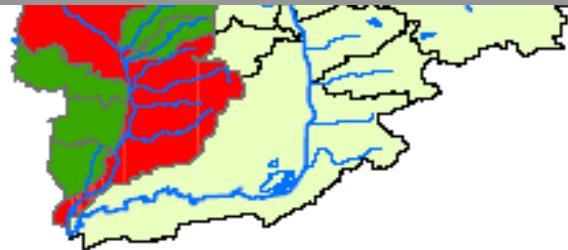
- For WB only 39% of watershed covered by the TMDLs, 100% under TALU

*The M&A part of TALU increased spatial integrity (CE element 2).*



existing or in-development TMDLs were identified

*The methods (CE elements 6-8) and the interpretive capacity (elements 10-12) led to better definition of causes.*



sources to impairments

- An important step towards implementing Tiered Aquatic Life Uses



**Linda S. Adams**  
*Secretary for  
Environmental Protection*

# State Water Resources Control Board

## Office of Information Management and Analysis

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**Arnold Schwarzenegger**  
*Governor*

2 February 2010

Dear Water Quality Stakeholders:

### **DEVELOPMENT OF BIOLOGICAL OBJECTIVES FOR CALIFORNIA**

The State Water Board is initiating the process to develop biological objectives for freshwater streams and rivers in California. You are invited to participate in the project kickoff meetings on 8 and 11 March 2010.

8 March 2010, 1:00 – 4:00 p.m.  
Cal EPA Building  
1001 I Street, Sacramento

11 March 2010, 9:00 a.m. – 12:00 p.m.  
SCCWRP  
3535 Harbor Blvd., Suite 110, Costa Mesa

The purpose of these meetings is to educate stakeholders on the project and initiate the process of assembling the stakeholder, regulatory, and scientific committees that will help guide the effort. A brief discussion of the purpose and background of the project is provided below.

Protecting the integrity of biological resources in streams and rivers is one of the primary goals of California's water quality regulatory efforts. Historically, the Water Boards focused their monitoring, assessment, and regulatory efforts almost exclusively on chemical and physical criteria. Recognizing the value of directly measuring biological integrity, several Water Board programs conduct bioassessment monitoring and some require bioassessment in permits. However, State and Regional Water Board plans and policies do not contain numeric objectives or guidance for using biological data in regulatory decision-making. Therefore, biological objectives are needed to provide the narrative or numeric benchmarks that describe conditions necessary to protect aquatic life beneficial uses. This initial effort will focus on wadeable perennial streams and rivers.

The absence of biological objectives or the lack of guidance has limited the effectiveness of many Water Board programs, leading to:

- the inability to objectively assess whether aquatic life beneficial uses are supported;
- the inability to assess whether chemical and physical criteria are sufficient to protect aquatic life (i.e., whether permits relying on chemical and physical criteria alone are achieving healthy streams & rivers);
- inconsistencies in identifying impaired waterbodies;
- costly development of biological targets on a project-by-project basis.

These problems can be resolved by employing modern tools for directly measuring and protecting aquatic life and developing thresholds and guidance for assessing the data.

# Summary - What Are the Benefits?

*A TALU program will allow us to:*

1. Identify and preserve the highest quality resources beyond CWA minimums.
2. Depict existing conditions with more accuracy.
3. Set realistic and attainable management goals.
4. React better to incremental changes.
5. Determine appropriate management actions when conditions decline.