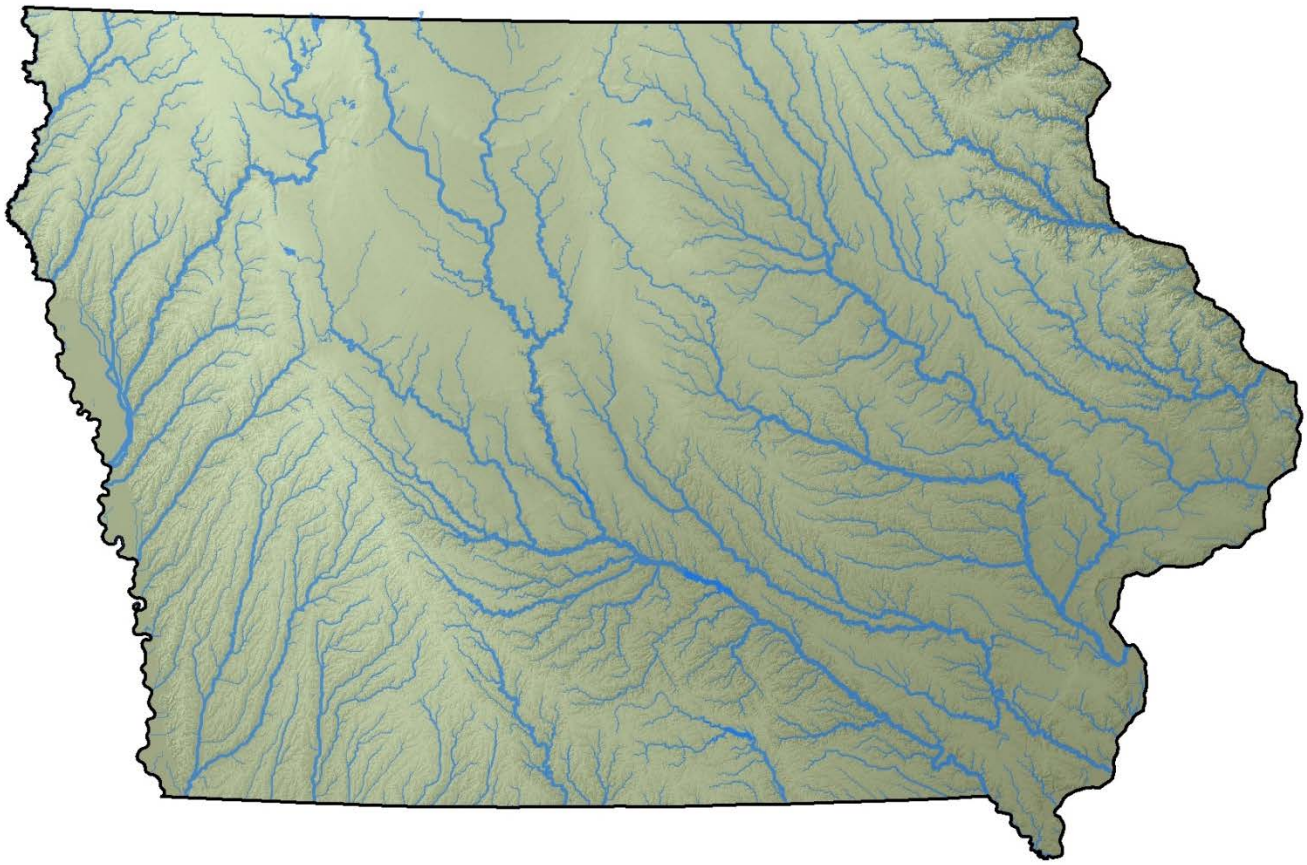
State of Iowa



Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program

Updated October, 2015

Introduction -

In August, 2011, the Environmental Protection Agency (EPA) and State program managers began the process of developing a new long-term vision for the Clean Water Act Section 303(d) program. Section 303(d) serves as the middle-man in the Clean Water Act by bridging the gap between Water Quality Standards and monitoring data on one side to implementation activities in the form of permits for point sources and valuable information for nonpoint source watershed projects on the other side. This section of the Clean Water Act is represented by two programs in the Iowa Department of Natural Resources. The first is the Integrated Reporting Program responsible for 305(b) reporting and 303(d) listing. The 303(d) list is commonly referred to as the Impaired Waters List. The Impaired Waters List is submitted to EPA every two years and incorporates water quality monitoring data analyzed against the State of Iowa Water Quality Standards. Inclusion on the Impaired Waters List triggers the need to develop a Total Maximum Daily Load (TMDL) for that water body. The TMDL Program constitutes the second half of Section 303(d) of the Clean Water Act. A TMDL document contains two distinct parts, known colloquially as the "math" and the "path." The "math" refers to the actual TMDL calculation, which sets the total maximum daily load (and usually a longer time step for implementation purposes). This daily load is parsed out between a margin of safety protective of the water body, a sum of Waste Load Allocations to all permitted point sources in the watershed, and the sum of Load Allocations to all nonpoint or non-permitted sources of pollution. The "path" refers to Iowa DNR's efforts at developing implementation and monitoring chapters in the document, which aim to provide a starting point for local planning efforts.

During the first decade of the TMDL Program, TMDL documents were developed as a response to a Consent Decree – a legal requirement to complete TMDLs for all waters listed on the 1998 Impaired Waters List. When Iowa's Consent Decree was officially closed, the State shifted to a new priority for developing TMDL documents. This priority focused on mostly small lake watersheds that held persistent local interest in water quality improvement. The documents were intended to serve as a useful bridge for the Section 319 Program to address nonpoint source pollution. This approach helped provide many potential projects for the Section 319 Program and launched various local watershed improvement projects.

The next iteration of the Section 303(d) programs look to combine successful elements learned throughout the past 15 years in Iowa and throughout the country while responding to new pressures. The Long-Term Vision does not stand as a static document as priorities, funding, personnel, etc. all play a role in how the programs most efficiently and effectively deliver a product that is both defensible and useful to aid in improving water quality. The Long-Term Vision identifies six pillars. Four of these pillars are "load bearing" in that they will play a lead role in all TMDL programs throughout the country: Prioritization, Assessment, Engagement, and Integration. The other two pillars, Protection and Alternatives, allow for creative approaches when a standard TMDL may not be the optimal choice. The ability to develop state specific priorities, engaging appropriate local stakeholders, integrating our work with other program priorities, and employing our creativity in addressing issues better and smarter as they present themselves truly gives rise to a tailored approach.

Prioritization – *For the 2016 integrated reporting cycle and beyond, States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals*

Summary:

Iowa DNR prioritizes TMDLs that are able to address impairments on waterbodies with a high potential for social impact. An overwhelming focus of the state of Iowa has been nutrients and nutrient related issues. Additionally, the State of Iowa and its citizens place great value on their lake systems for recreation. As a result, the Iowa DNR will focus first and foremost on lake systems impaired for eutrophic conditions (algae, turbidity, pH), which as of the 2014 Impaired Waters List includes 32 waterbodies with a total of 56 impairments (Figure 4). The Iowa DNR will also pursue a state-wide TMDL for bacteria impaired lake beaches, which includes 33 impairments across the state currently (Figure 5). These swimming beaches are an important element in the recreational aspect of Iowa lakes. Finally, we had planned to prioritize the Skunk River Nitrate TMDL. Three other river basin Nitrate TMDLs were already completed in Iowa, however, the 2014 Impaired Waters List removed the Nitrate impairment for the Skunk River and it is no longer on the radar for development. If the impairment manifests itself in the future, the TMDL Program will reevaluate at that time. That leaves 33 projects for a total of 89 TMDLs remaining before the 2022 deadline.

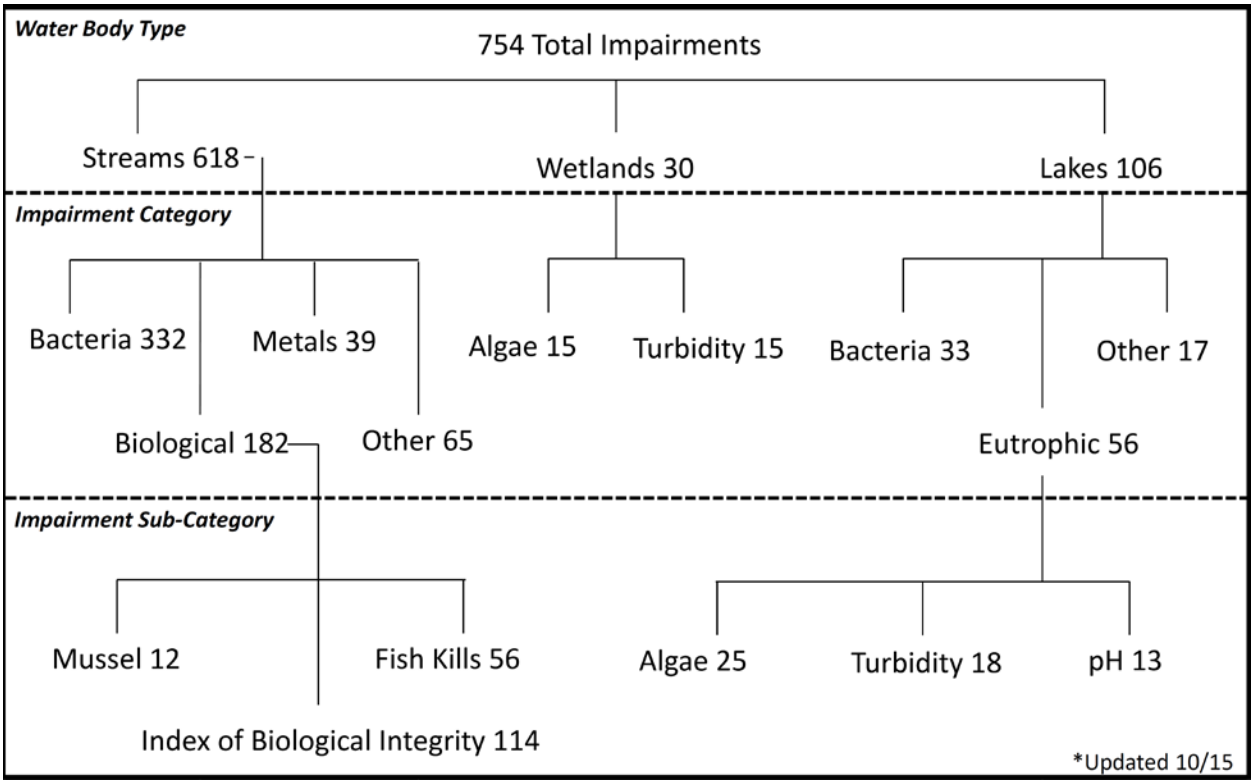


Figure 1 – Breakout of Impaired Waters List

To understand priorities, we must first look at the Impaired Waters List. The TMDL Program's candidate pool for development is restricted to impaired waters on Category 5 of the Integrated Report and, potentially, high quality waters for protection. The 2014 Impaired Waters List contains 751 total impairments (Figure 1). These impairments break out into 618 stream / river impairments, 30 wetland / oxbow impairments and 106 lake impairments.

Stream impairments by pollutant include 332 bacteria, 182 biological, 39 metals, and 65 other. Biological impairments can be further broken out as 114 impairments due to low scores on one of the indices of biotic integrity (IBI), 56 from fish kills, and 12 from mussel impairments. Biological impairments are listed in Category 5B of the Impaired Waters List, stated as "Cause Unknown." By definition, these impairments cannot have a TMDL written until a pollutant is identified as the cause of the impairment. Therefore, these impairments may or may not require a TMDL once the cause is determined. For example, the cause may be habitat related and will not require a TMDL. Traditional methods of determining cause are prohibitively expensive for the TMDL Program in Iowa. Ideally, these streams would be considered as "requires further investigation" rather than "requires a TMDL," but for purposes of remaining consistent with the language of the 303(d) list, they remain with the rest. A statewide mussel survey is updating the existence of mussel impairments while a Fishkill Follow-up program is doing the same for fish kill impairments. A systematic verification sampling to confirm IBI impairments has been an ongoing effort for the past few years, but also carries a substantial cost. Going forward, impairments verified during these monitoring efforts will undergo a new investigative initiative led by the TMDL Program's two staff biologists.

Wetland / oxbow systems include 15 algae and 15 turbidity impairments. Wetland impairments are relatively new to the Impaired Waters List and the DNR is currently investigating how a TMDL process for impaired wetlands will be most effective for the system. Oxbow systems are essentially infant wetlands and are, geologically speaking, filling in as nature intended and therefore require additional investigation for how best to write a TMDL for that type of system. The 106 lake impairments include 33 bacteria, 56 eutrophic, and 17 other pollutant types. The eutrophic impairments can be further broken out to include 25 algae, 18 turbidity, and 13 pH impairments.

Each of these impairment types carries a level of complexity and cost in time and money for the DNR to develop a TMDL. For example, multiple stream bacteria TMDLs in the same river basin could efficiently be developed using a load duration curve approach with a minimal amount of data required. On the other hand, a large complex lake system using advanced modeling techniques would take more time and cost more in terms of data requirements. A river basin bacteria project may produce, say, 15 TMDLs, whereas the same amount of work effort may only produce 1 larger, more complex lake system TMDL.

Additionally, each type of system holds various levels of social impact. Multiple efforts reveal the importance of lake watersheds to the Iowa people, including Iowa State University's research on the local economic impact of lake systems (CARD, 2009 – http://www.card.iastate.edu/environment/nonmarket_valuation/iowa_lakes/). On the flip side, there is relatively little evidence in the potential social impact of reducing bacteria in streams.

Plotting each impairment type on a simple 2x2 plot reveals a path toward prioritization, depicted in Figure 2. The upper left quadrant of the chart includes projects that are relatively high in social impact and relatively low in complexity / cost for development. Projects that clearly fit that description include the smaller lake systems impaired for eutrophic conditions and the Skunk River Nitrate impairment.

The upper right quadrant contains projects that hold a relatively high social impact but are more complex and may have greater data needs for TMDL development. These projects include larger and more complex lake systems, protection TMDLs for some of our high quality resources, or a statewide TMDL for something like beach bacteria impairments. Staffing and funding limitations would limit the DNRs ability to complete a lot of these types of projects.

Quadrant 3 contains stream bacteria projects where there is a low social impact but the investment in development is relatively low. Finally, quadrant 4 includes projects with a relatively low social impact but high in complexity. These are projects that would represent low priorities at this time.

Using this approach, the TMDL Program can more easily decide what projects to select for development that will 1) have a greater potential to be of value to the local users of the resource, and 2) provide a tool that leads to measurable water quality improvement.

Social Impact	Complexity / Cost: Low	Complexity / Cost: High
High	**Priority Group I** Impairments with relatively *high* social impact and a relatively *low* complexity & or cost for development. Example: • Smaller Eutrophic Lake Systems • River Nitrate	**Priority Group II** Impairments with relatively *high* social impact and a relatively *high* complexity & or cost for development. Example: • Larger / Complex Lake Systems • Protection TMDLs • Statewide TMDL
Low	**Priority Group III** Impairments with relatively *low* social impact and a relatively *low* complexity & or cost for development. Example: • Stream Bacteria	**Priority Group IV** Impairments with relatively *low* social impact and a relatively *high* complexity & or cost for development. Example: • Biological Impairments • Lake Mercury Impairments • Metals Impairments

Figure 2 – Prioritization chart

Rotating Basin Approach –

One popular approach for implementing TMDL programs across the country is commonly referred to as the rotating basin approach. While the specifics vary state to state, the essence is to focus on a river basin or group of river basins for a specific amount of time and then move to the next river basin. Employing this approach to TMDL development helps increase efficiency in working with similar resources and can optimize data collection efforts. Additionally, focusing on a specific geographic area could have the potential to influence local decision making with a steady presence of public outreach.

In Iowa, this approach has not been used in the past but is an approach that holds some appeal under the new vision. The state can be divided into 4 major basins as shown in Figure 3; Northeast (Wapsipinicon, Maquoketa, and Turkey Rivers, and Mississippi River Drainages); the Iowa-Cedar; the Des Moines-Skunk; and the Western-Southern.

Focusing on priorities, the TMDL Program can move from basin to basin when finished addressing these priorities. In 2014, most of the TMDL work has been in the Iowa-Cedar River basin. The next major area of emphasis will be in the Western-Southern basin. Work will then move to the Des Moines-Skunk basin and finish up in the Northeast basin.

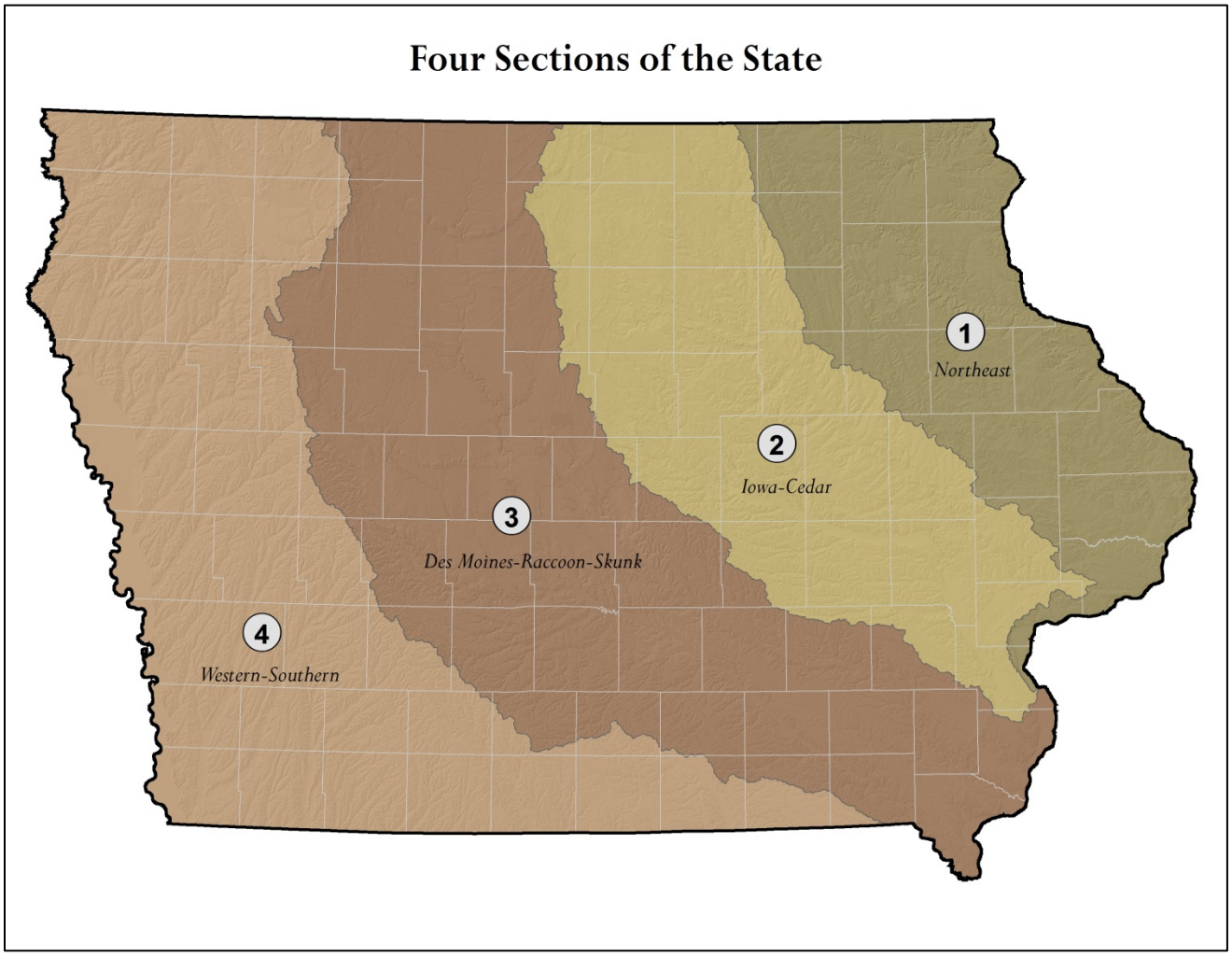


Figure 3 – Basin approach map

Next Level Priorities -

The Iowa DNR will investigate the feasibility of protection TMDLs for the state's Outstanding Iowa Waters. At this time, Iowa DNR is not ready to commit to developing a protection TMDL but will consider it in the future. The Iowa DNR will also potentially investigate wetland and oxbow lake impairments and determine the feasibility of a TMDL on such a system. The state will look into pursuing alternatives to TMDLs to address biological impairments. If there are resources available and the above options are exhausted, the Iowa DNR would consider developing basin-wide bacteria TMDLs.

Flexibility -

Given that a new Impaired Waters List is issued every two years, a certain amount of flexibility will be accounted for in the Vision. After each issuance of the Impaired Waters List, the TMDL program will evaluate any potential new projects that should be added into the priority schedule. For example, new eutrophic lake impairments (Figure 4) will be worked into the system as much as possible as time / money allows. If a new state priority manifests itself between now and the end of 2022, the TMDL Program will work with EPA in discussing a shift toward addressing that new priority. Additionally, some of the projects the Iowa DNR is committing to under the vision may be delisted or be of a lower priority than an impairment issued on a future Impaired Waters List. In that case, the Iowa DNR reserves the right to substitute projects, aiming for the agreed upon total catchment area by 2022 instead of a static list of priorities set in this document.

Maps and Lists of Priorities –

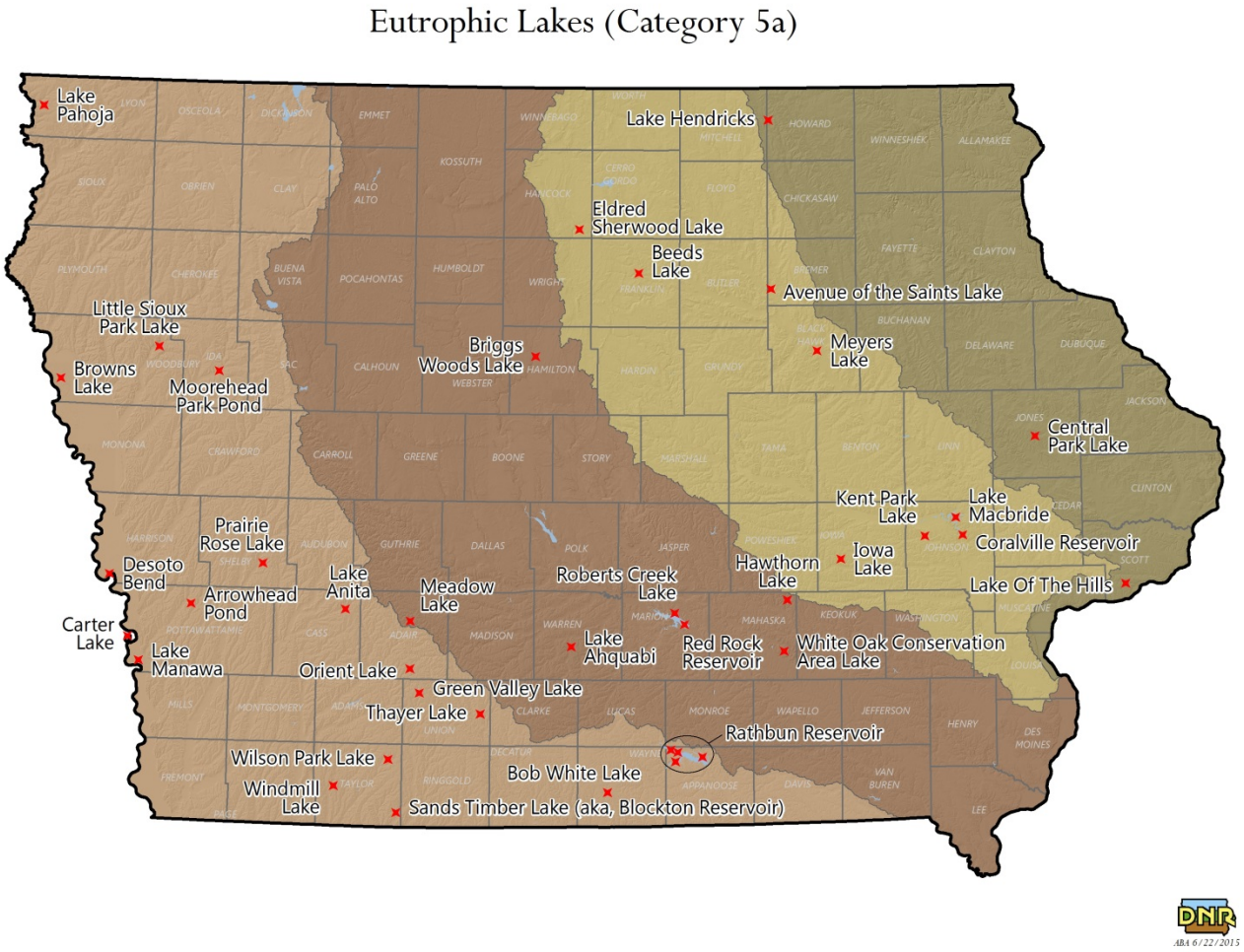


Figure 4 – Eutrophic Lakes on Category 5a

Eutrophic Lake Impairments

Year	NE Iowa Lakes	Impairment(s)		
2014	*Frog Hollow (aka Volga Lake)*	*Algae*	*Turbidity*	
2016	Central Park Lake	Algae		
2022	Lake Of The Hills	Algae		
2022	Lake Hendricks	Algae	pH	
Year	**Iowa / Cedar**	**Impairment(s)**		
2013	*Hannen Lake*	*Algae*	*pH*	
2013	*Casey Lake*	*Algae*	*pH*	
2014	*Otter Creek Lake*	*Algae*		
2014	*Upper Pine Lake*	*Algae*		
2014	*Kent Park Lake*	*Algae*	*pH*	
2016	Iowa Lake	Algae		
2017	Beeds Lake	Algae		
2016	Eldred Sherwood Lake	Algae		
2017	Avenue Of The Saints Lake	Algae	Turbidity	pH
2018	Coralville Reservoir	Turbidity		
2018	Lake Macbride	Algae		
2022	Meyers Lake	Algae		
Year	**DSM / Raccoon / Skunk**	**Impairment(s)**		
2014	*Beaver Lake*	*Algae*	*pH*	
2020	Hawthorn Lake	Algae	Turbidity	
2020	White Oak Conservation Area Lake	Algae		
2021	Red Rock Reservoir	Turbidity		
2021	Roberts Creek Lake	Algae	Turbidity	
2021	Meadow Lake	Algae		
2021	Lake Ahquabi	Algae		
Year	**Western / Southern Iowa**	**Impairment(s)**		
2013	*Little River Lake*	*Turbidity*		
2016	Rathbun Reservoir	Turbidity		
2016	Bob White Lake	Algae	Turbidity	
2016	Windmill Lake	Algae	Turbidity	
2017	Thayer Lake	Algae	Turbidity	
2016	Lake Pahoja	Algae	pH	
2016	Briggs Woods Lake	pH		
2018	Green Valley Lake	Algae		
2018	Lake Anita	Algae		
2018	Little Sioux Park Lake	pH		
2019	Moorehead Park Pond	pH		
2019	Orient Lake	Algae	pH	
2019	Prairie Rose Lake	Algae	Turbidity	pH
2019	Sands Timber Lake (aka, Blockton Reservoir)	Turbidity		
2020	Arrowhead Pond	Algae		
2020	Wilson Park Lake	Algae		

**Red italic text denotes approved TMDLs since 2012 Impaired Waters List issuance*

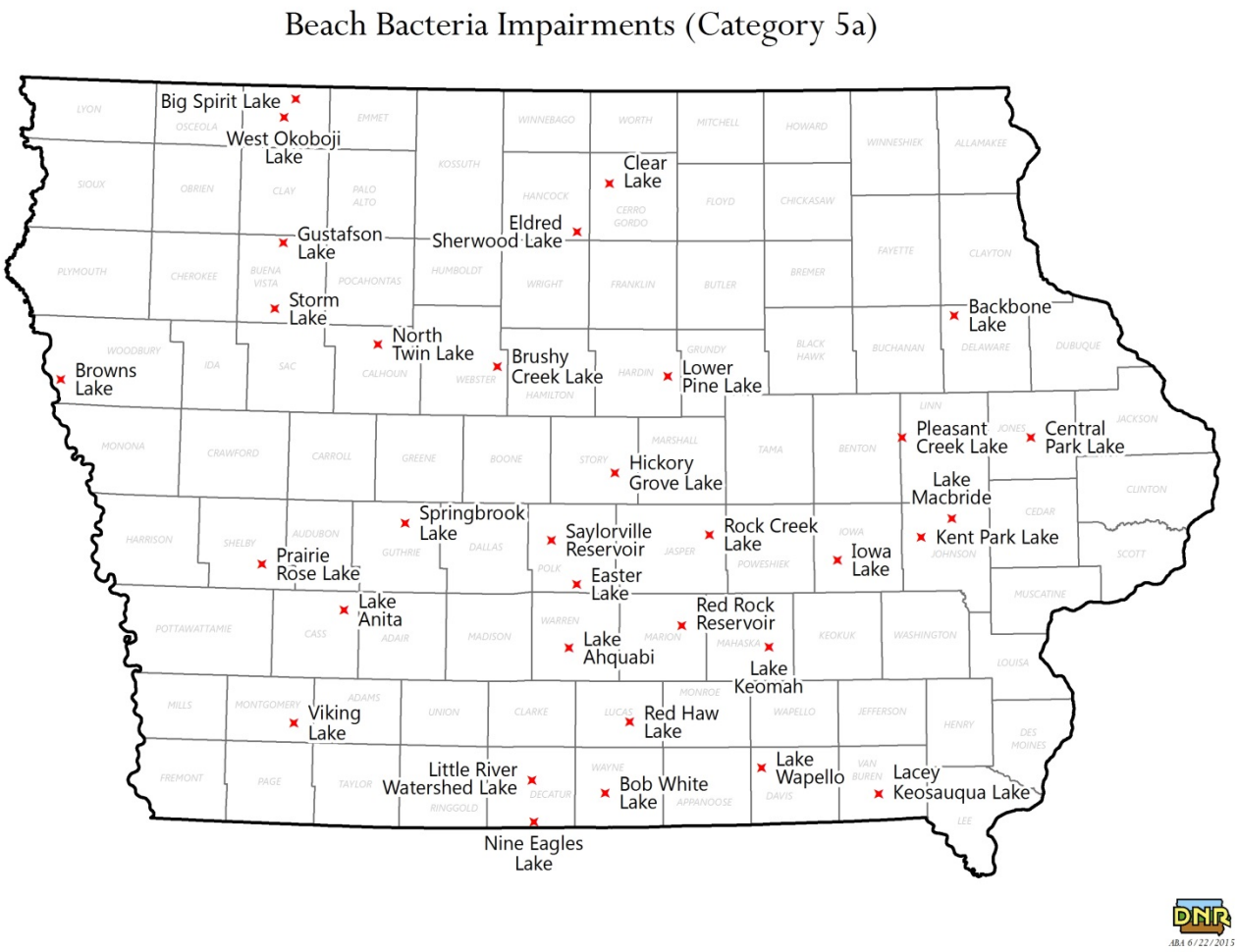


Figure 5 - State wide Beach Bacteria TMDL list – 2014 Impaired Waters List. 5a denotes category on the Impaired Waters List that indicates impairement in need of TMDL.

Backbone Lake	Iowa Lake	North Twin Lake
Big Spirit Lake	Kent Park Lake	Pleasant Creek Lake
Bob White Lake	Lacey Keosauqua Lake	Prairie Rose Lake
Browns Lake	Lake Ahquabi	Red Haw Lake
Brushy Creek Lake	Lake Anita	Red rock Reservoir
Central Park Lake	Lake Keomah	Rock Creek Lake
Clear Lake	Lake Macbride	Saylorville Reservoir
Easter Lake	Lake Wapello	Springbrook Lake
Eldred Sherwood Lake	Little River Lake	Storm Lake
Gustafson Lake	Lower Pine Lake	Viking Lake
Hickory Grove Lake	Nine Eagles Lake	West Okoboji Lake