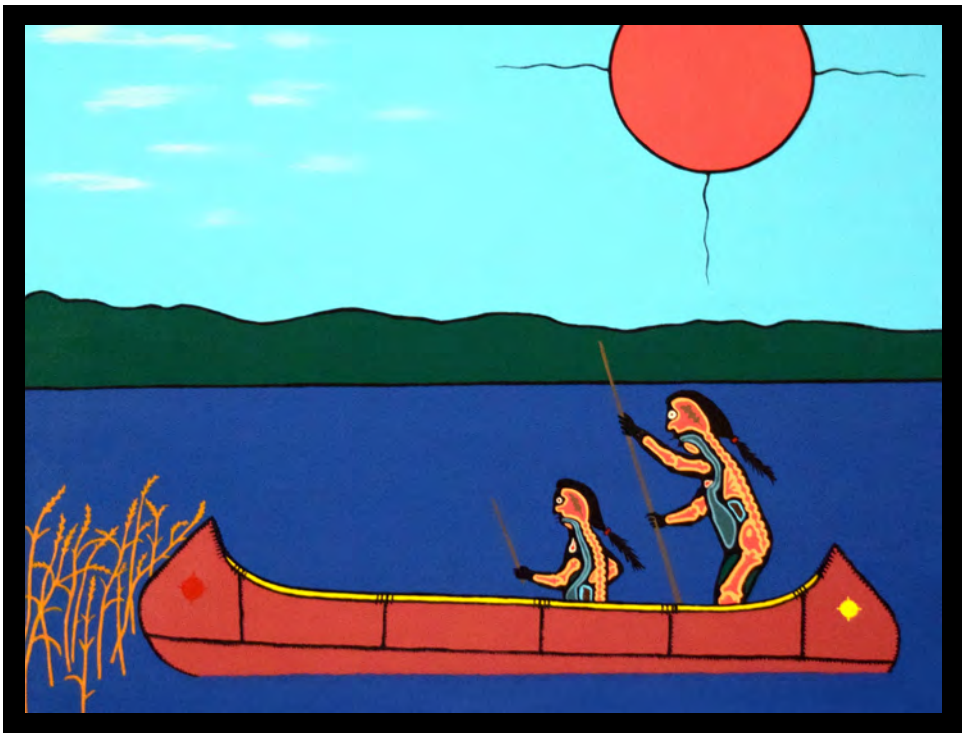
WILD RICE MONITORING FIELD GUIDE



By Tonya Kjerland

"Because we can't speak the same language, our work as scientists is to piece the story together as best we can. We can't ask the salmon directly what they need, so we ask them with experiments and listen carefully to the answers. We stay up half the night at the microscope looking at the annual rings in fish ear bones in order to know how the fish react to water temperatures. So we can fix it. We run experiments on the effects of salinity on the growth of invasive grasses. So we can fix it. We measure and record and analyze in ways that might seem lifeless but to us are the conduits to understanding the inscrutable lives of species not our own. Doing science with awe and humility is a powerful act of reciprocity with the more-than-human world."

~ From "Braiding Sweetgrass" by Robin Kimmerer

WILD RICE MONITORING FIELD GUIDE

Companion to the *Wild Rice Monitoring Handbook*

Electronic copies of this document and the *Wild Rice Monitoring Handbook* are available at:
www.seagrant.umn.edu/coastal_communities/wildrice

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OVERVIEW

The methods described in the Wild Rice Monitoring Field Guide have been designed to respect Native American, First Nation and like-minded peoples' views on the sacred nature of wild rice.

This Field Guide supports field crews working to monitor wild rice populations. It establishes a standardized method for measuring wild rice biomass and productivity. It describes how to collect "core wild rice variables" and offers aid in identifying common aquatic plants that often occur with wild rice.

The Field Guide is a companion to the *Wild Rice Monitoring Handbook*, a comprehensive reference for designing wild rice surveys. The *Handbook* includes field sampling protocols from the Field Guide, as well as generic wild rice biomass equations, information about the spiritual and cultural significance of wild rice, and a review of the biology of wild rice. It also presents a case study illustrating how data collected using these methods may be applied. It includes guidelines for setting up a monitoring plan, instructions for determining the number and location of sample points, instructions for creating site- or area-specific biomass equations, and blank field and lab data sheets. The *Handbook* also provides decision trees and tables to guide managers with decisions necessary to quantifying wild rice abundance and distribution.

The measurements recommended in the Field Guide and the *Handbook* will be most useful when taken over a series of years and used to assess trends on a given water body. These methods are not intended to establish relative condition or

productivity between (or across) waters where wild rice grows. These are also not methods for identifying productive or unproductive waters with reference to wild rice.

HOW TO USE THIS GUIDE

The "core wild rice variables" described in this Field Guide are a set of carefully selected parameters that, taken as a whole, provide useful information to assess the health of wild rice populations.

Prior to sending crews out into the field, managers will need to determine the sampling pattern (grid, line transect, sub-sampling grid) and number of sampling points. The resource manager will also need to determine and tell the crew whether they should A) collect only the seed heads of the sample plants OR B) collect entire sample plants. Which method you choose will dictate which color you will follow on Step 9 in this Field Guide.

Sampling 40 points per water body in a grid pattern using a 0.5 m^2 quadrat frame is recommended. For detailed guidance about determining the number and layout of sample points, see the *Wild Rice Monitoring Handbook*.

Collecting seed heads (and seeds) is an important part of a wild rice inventory because the number and size of seeds are critical determinants of plant vitality and ability to reproduce. The potential number of seeds can be known by counting the tiny stalks that produce the seeds, called the female pedicels.

One way to measure biomass involves collecting entire plants, drying, and weighing them. As explained in the *Handbook,*

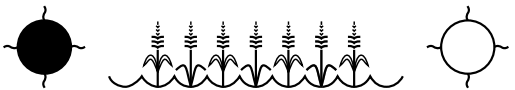
resource managers can generate a site- or area-specific biomass equation this way. In these instances, counting the number of stalks on the sample plants during field data collection and collecting entire sample plants is necessary. See the *Handbook* for guidance on determining how and when to create site- or area-specific biomass equations.

Alternatively, and less-destructively, resource managers can calculate reasonably accurate biomass estimates using generic equations involving plant height and seed number. See Standard Operating Procedure #4, "Using Generic Biomass Equations," in the *Handbook* for details.

Regulations Pertaining to Wild Rice

Rules and protections for wild rice exist in many areas. If you are considering physically collecting wild rice plants, think carefully about whether or not this is necessary and then check into tribal, state, and other laws to determine if you need a permit in order to collect plants. Permits may also be required for collecting seeds and seed heads.

Biomass is another name for the "weight" of an individual or group of organisms. Biomass is a commonly used measure of plant productivity that relates directly to indices of wild rice health. Biomass estimates allow managers to compare wild rice productivity for a single lake, flowage, or river reach from year-to-year.



MEASURING CORE WILD RICE VARIABLES

For every waterbody, field crews will need to outline the area occupied by wild rice according to the method selected by the resource manager.[1]

Field crews will collect the following core wild rice variables in approximately 40 sample points per water body:

Variables for Generic Biomass Model

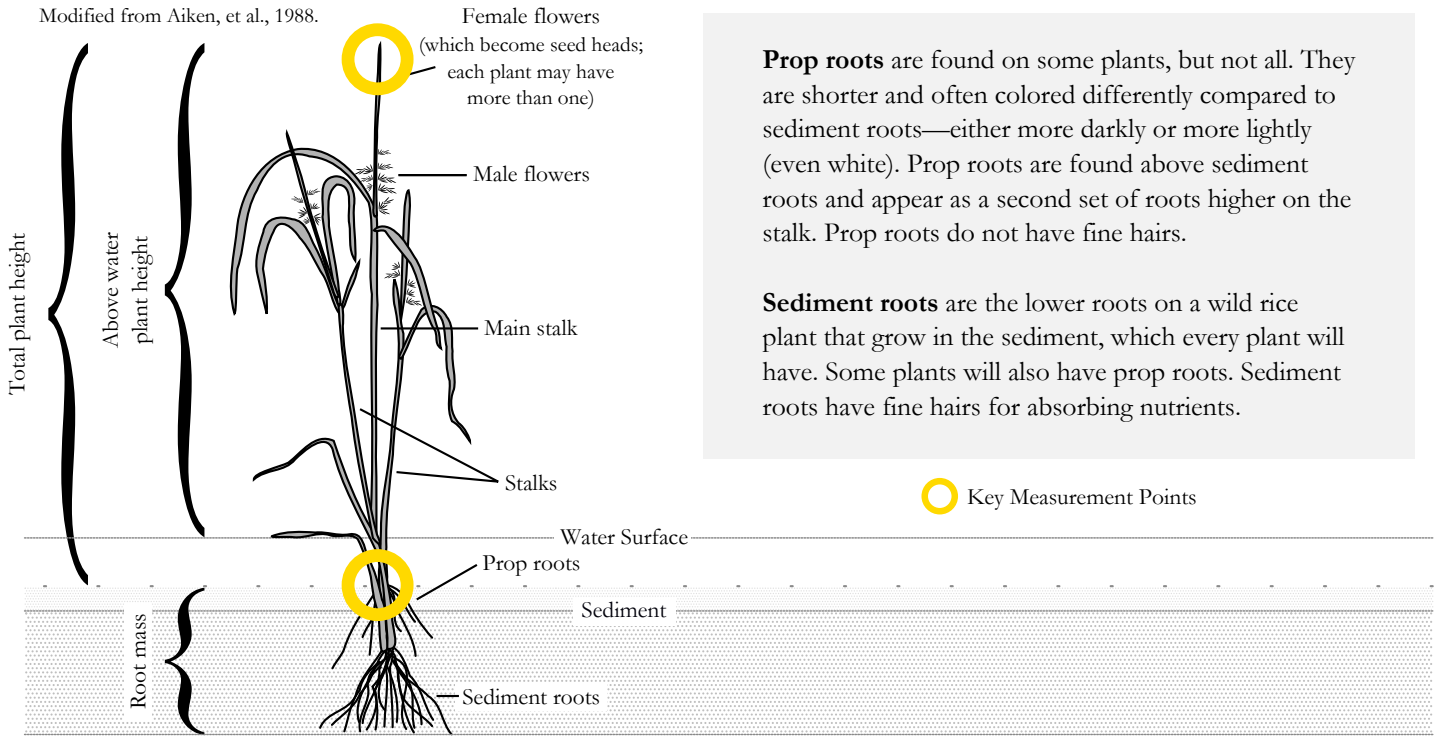
- Stalk density within the quadrat frame
- Water depth within the quadrat frame or as close as possible
- Sample plant height (ABOVE water or TOTAL)
- Seed heads from sample plant so the pedicels can be counted back in the lab
- The names of other plants within the quadrat frame

Variables for Site-Specific Biomass Model

- Stalk density within the quadrat frame
- Water depth within the quadrat frame or as close as possible
- Collect entire sample plant so its dry weight can be determined back in the lab
- TOTAL sample plant height
- The number of stalks on the sample plant
- The names of other plants within the quadrat frame

While conducting fieldwork, also note brown spot fungi information, shoreland and water use, weather information that might affect the data, and concerns for wild rice plant growth.

WILD RICE PLANTS



Prop roots are found on some plants, but not all. They are shorter and often colored differently compared to sediment roots—either more darkly or more lightly (even white). Prop roots are found above sediment roots and appear as a second set of roots higher on the stalk. Prop roots do not have fine hairs.

Sediment roots are the lower roots on a wild rice plant that grow in the sediment, which every plant will have. Some plants will also have prop roots. Sediment roots have fine hairs for absorbing nutrients.

[1]See Step 12 on page 20 of this Guide or Appendix B, "Estimating Wild Rice Stand Area," in the *Handbook*.

EQUIPMENT NEEDED

□ Canoe
□ Canoe cushions
□ Paddles (3)
□ Life jackets
□ Drinking water and food
□ First aid kit, hand sanitizer
□ Hat and sunglasses, sunscreen, rain gear
□ Cell phone, fully charged, in waterproof bag (for emergencies)
□ Insect repellent
□ Quadrat frame, 0.5 m^2, or 0.71 m x 0.71 m (one corner marked with colored tape, notch, or colored PVC elbow)
□ Handheld GPS unit (fully charged, with spare batteries, ideally with tracking function)
□ List of GPS points to sample printed on water-resistant paper
□ Map of water body showing labeled GPS points, i.e. "grid map" OR if using transects, simply a map of the area (laminate or print on waterproof paper)
□ Metal box clipboard
□ Device to measure water depth (e.g. secchi disk with chain or rope taped to meter stick or measuring rod—the measuring rod should rest on top of the secchi disk. This device helps to measure water depth in soft, flocculent sediments.)
□ Permanent marker
□ Water-resistant paper (for labels to put inside bags)
□ Mechanical pencils

□ Field data sheets printed on water-resistant paper (see *Handbook* or the back of this Guide)
□ Tape measure or meter stick (needed to measure wild rice plant height)
□ Equipment for collecting water and/or sediment samples, if part of the sampling plan
□ Wild Rice Monitoring Field Guide (includes Plant ID Key)
□ Additional plant ID guides (for more comprehensive references)
□ Permits, if needed
□ Large (~2-gallon) zippered plastic bags (about 60) – for collecting seed heads and/or plants
□ Large scissors (for collecting seed heads)
□ Cooler with ice

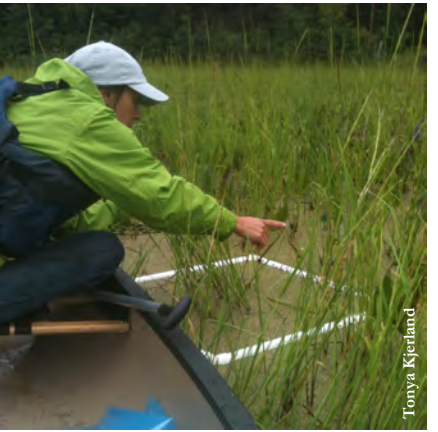
Helpful Tip: Use a copy of the Field Data Sheet on page 34 to record data.

FIELD SAMPLING PROTOCOL

1 **Locate Sample Points Using GPS Unit**
Referencing the map, navigate to the sample points using a GPS unit. If you are unfamiliar with this process or the GPS unit, practice ahead of time.

2 **Collect Water Quality and Sediment Samples...**
if required by your sampling plan. Do this BEFORE taking other measurements to avoid stirring up the sediment and contaminating the samples.

3 **Place Quadrat Frame Over the Plants to Measure Stalk Density**
Lower the quadrat frame straight down over the wild rice plants to the side of the canoe next to the seat of the person in front (same side each time). When placing the frame, if there are any stalks leaning in or out (due to thick rice, wind, canoe movement, etc.) they should be moved in or out accordingly.



Avoid Sampling Bias

- Do not simply place the quadrat frame on an area that "looks good"or is easiest to measure. Instead, use a methodical, non-biased way of deciding where to place the frame.
- Navigate to within 5 meters (~16 feet) of sample point coordinates. Stop and quickly stabilize the canoe. Don't back up or paddle an extra stroke to reach a "better" area.
- Place the quadrat frame in the water next to the seat of the person in front. Use the same side of the boat each time.
- If taking two quadrat readings per sample point, decide ahead of time and be consistent about placing the frame. See "Two-points-per-stop" method described in the *Handbook*.

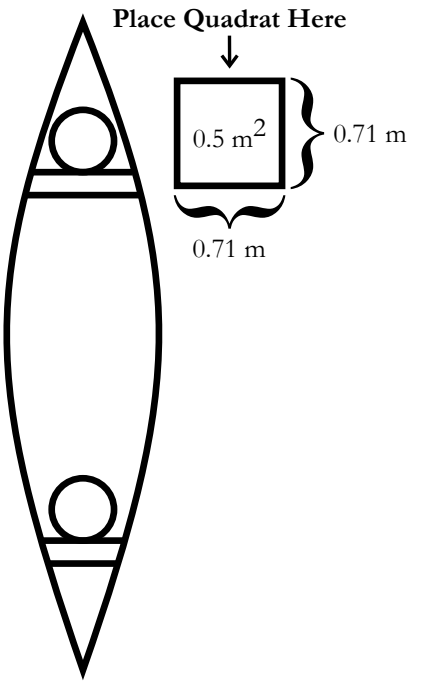
Skipping Sample Points

Sample points may be eliminated if they are not within suitable wild rice habitat. If sample points are skipped, add more sample points as needed to measure the required number of points. Reasons for skipping include:

- the water is too deep (greater than 4 feet for most locations)
- the point is located on shore
- there is an obstruction (e.g. a dock, floating mat of vegetation)
- the sediment is unsuitable

Record the reason for skipping on the Field Data Sheet

Having zero wild rice is not a valid reason to skip a sample site. If there is no wild rice in an otherwise suitable site, record it as "0" on the Field Data Sheet along with water depth and other plants. Don't leave blanks because this would mean "data missing." If wild rice has been damaged or cut down, make note and take photos, but don't include this point in the analysis unless you are particularly interested in this data.



4

Measure Stalk Density

Count the stalks that are inside the frame. **Count stalks, not plants.** Individual plants may have stalks within and outside of the frame.

5

Identify Other Plants in the Quadrat

- Use the Plant Identification Key in this Field Guide or other reference guides. Record the common name(s), using abbreviations if needed.
- If a plant cannot be identified, collect the plant for later identification.
- Label a large, zippered plastic bag: Unknown #1, etc.
    - Sample ID # & water body name
    - Date & time of day
    - Water depth
    - Note observations about leaves, flowers, and fruits:
        - emergent (above the water, like wild rice)
        - floating (floating on the surface)
        - submersed (below the surface entirely)
    - Color of flower
    - Technician initials
- Collect the entire plant – flowers, fruits, roots, stems, leaves…everything.
- Wash the roots carefully but thoroughly in the water.
- Remove sticks, bugs, etc., that are clinging to the plant.
- Include a duplicate label on water-resistant paper inside the bag.
- Store plants on ice in the cooler.

6

Select the Sample Plant

- Find the corner of the quadrat frame marked with colored tape, notch, or colored PVC elbow.
- Select the wild rice stalk that is nearest to the designated corner. Whichever plant this stalk is growing from is the sample plant.
- This will be the plant you measure and either:
  - A) collect seed heads from, OR
  - B) collect in its entirety.

7 Measure Sample Plant Height

- Circle on the Field Data Sheet whether measuring in inches or centimeters.
- Check box for which method used, and record plant height. Use one of the following methods:
  - A) Above water. Measure the sample plant's height from the water line to the top of the tallest stem.
  - B) Total. Uproot the plant and measure the distance from the top of the roots to the top of the tallest stem. If there are two sets of roots, measure from the top of the prop roots.

A) Above Water

B) Total

8

Measure Water Depth as close as possible to the Sample Plant

• Circle on the Field Data Sheet whether measuring in inches or centimeters. Use one of the following methods:

A) Use a device for measuring depth and record the device type used. Measuring water depth can be difficult due to thick plant growth and soft lake bottoms that are hard to define. The recommended device is a secchi disk attached to a marked rope or chain, which can be allowed to settle on the bottom. Temporarily tape the secchi and its chain or rope to a meter stick or measuring rod, then allow the secchi to settle to the bottom so that the stick rests directly on top of the secchi disk.

B) Measure water depth by uprooting the sample plant and measuring from the top of the roots to the water line on the plant. If there are two sets of roots, measure from the top of the prop roots (see page 5, Wild Rice Plants).

9 Collect Seed Heads OR Sample Plant to Take Back to Lab for Analysis

A) Seed Heads from Sample Plant

To assess the potential number of seeds requires removing the seed head portion of the plants and then counting the tiny stalks that hold female flowers (called pedicels).

- Label a plastic zippered bag with the sample point ID #, water body name, and date.
- Include a duplicate water-resistant label inside the bag.
- Using a scissors, cut the stem below the seed head on every stem of the sample plant and place it in a plastic zippered bag, store on ice. Gather all of the seed heads on the sample plant.

Back in the lab, to avoid decay, ***remove seed heads from the plastic bags as soon as possible*** *and store in labeled* ***paper*** *bags to dry until ready to count pedicels. Counting pedicels is necessary to calculate the number of potential seeds and whole plant biomass.*

B) Entire Sample Plant and Count Number of Stalks

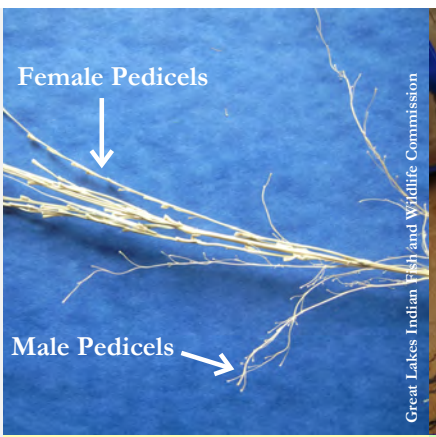
- Label a large (~2-gallon-size) zippered plastic bag with sample point ID #, water body name, plant height (indicate units), and date.
- Include a duplicate water-resistant label inside the bag.
- Holding the bag to catch falling seeds, carefully run your hand over the seed head to collect loose seeds.
- Pull the plant slowly up out of the sediment, trying to retain as many seeds and roots as possible.
- Gently wash the roots in the water, and pick off sticks, bugs, or other materials sticking to the wild rice plant.
- Fold the plant accordion style, trying to save as many seeds as possible, and place the whole plant in the bag. Store on ice.

Back in the lab, within 24 hours, ***remove the wet plants from their bags.*** *Repackage into labeled* ***paper*** *bags and store in a dry area.*[2]

About Collecting Seed Heads
For information on processing the samples (i.e. counting potential seeds/female pedicels) see the *Wild Rice Monitoring Handbook*. It is important to collect the entire seed head from every stalk on the sample plant and to process them as soon as possible after returning to the lab.

About Collecting Wild Rice Plants
To create a site- or area- specific biomass equation, it's necessary to collect wild rice plants, dry and weigh them. These results are compared to stem height and seed number to develop the equation. **Specific biomass equations are optional**, as generic equations exist; see the *Handbook*.

Helpful Tip: The female pedicels are larger and sturdier and located above the male structures on the stem (see photo, close right). Because seeds fall off regularly, counting pedicels is the best way to estimate total seed production. When counting pedicels, it is important to count only the female ones.



A) Female Pedicels on Seed Head

B) Collection of Wild Rice Plants

[2]Alternatively, allow plants to drip-dry onto canvas in the lab. Tag them for later identification with folded-over "lab tape" or aluminum write-on tags.

10

Record Field Notes

These observations will help reveal the environmental conditions that affect wild rice growth.

- Complete weather and comments on the Field Data Sheet.
- Note presence of animals, birds, pests, or signs of plant disease. **Examples:** Rice Worms (*Apamea apamiformis*), Muskrats, Swans, Ducks, Other Birds, Rusty Crawfish, Ergots, etc.
- Write legibly using pencil or waterproof ink!
- Important: Do not leave blanks on the Field Data Sheet. If the data cannot be collected, record the reason. A blank in a dataset means "data missing," whereas a "zero" means, "we looked and didn't detect this variable."

Wild Rice Worm

Wild Rice Worm and Seed

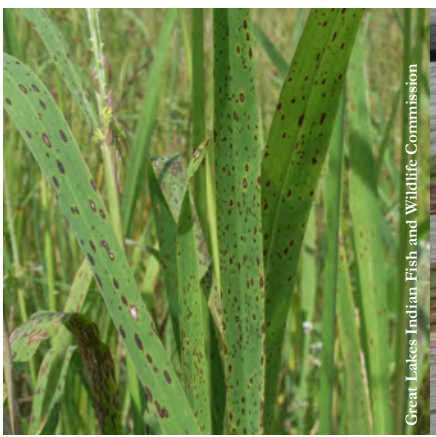
Ergots on Wild Rice

Muskrat Lodge

11

Record Brown Spot Fungal Disease Severity within the Quadrat Frame

- Record the severity of brown spot fungal disease at five random sample points across the water body. **SEVERITY INDEX: "0" = wild rice leaf is free of the disease; "low" = less than 1/3 of the leaf is covered; "high" = more than 1/3 of the leaf is covered.** See images below.
- Make your best estimate, being as consistent as possible across the sites.



"Low" severity infection
LESS than 1/3 of leaf covered

"High" severity infection
MORE than 1/3 of leaf covered

12

Estimate Wild Rice Stand Area

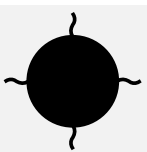
Method A: Canoe or walk around the wild rice stand using a GPS with a tracking function to record points and create an outline (bare minimum points needed = 4; 5-sec. or shorter setting for tracking function recommended). The edge of the stand may be identified by moving to the open water where there is no wild rice and then defining the edge according to the most outlying stem. Even one stem is considered part of the wild rice stand. This is a relatively time-consuming method. If there are areas without wild rice, or areas in which wild rice is of differing densities, these areas may need to be treated separately. (Reference: Valerie Brady, Natural Resources Research Institute)

Method B: While completing sampling, use a map of the water body printed on waterproof paper with a grid of GPS points. Draw areas of 1) wild rice, 2) sparse rice, 3) open water, or 4) other vegetation. Later, using a transparent grid overlaid on the lake map, estimate area of wild rice in relation to total lake area. These polygons may also be digitized for use with mapping software. For making within-lake comparisons, "sparse wild rice" may be defined as "areas with greater than one canoe length between rice stalks." (Reference: Darren Vogt, 1854 Treaty Authority)

About Estimating the Area of a Wild Rice Stand

It is useful to create an approximation of the outline of areas where wild rice is found growing each year. Knowing this area is essential for computing overall biomass and for mapping challenges, such as interpolating values between sample points. Because using GPS to outline wild rice beds is subjective, the accuracy of area measurements may vary between surveyors. Areas may move considerably from year to year due to the variability of wild rice growth. In order to standardize these approximations, it is recommended that whoever does the work be given clear instructions, make notes on what criteria they used to determine where to map and that the same crew assess each area in a given year. Because of GPS inaccuracy and field technician subjectivity associated with collecting this type of data, it should only be used as an estimate for comparing year-to-year variability *within* a waterbody. It is not intended to provide a mechanism for assessing relative condition or productivity *between* (or *across*) waterbodies.

Multiple methods for estimating the area of wild rice stands are described in Appendix B in the *Wild Rice Monitoring Handbook*. The two methods recommended in this Field Guide were chosen due to their ease of implementation.



Back in the Lab: Dry and Weigh Wild Rice Plants

Instructions are provided in Standard Operating Procedure #2, "Drying and Weighing Wild Rice Plants," in the *Wild Rice Monitoring Handbook*.

PLANT IDENTIFICATION KEY

Plant Species Often Found Growing with Wild Rice

Important: The following plants are commonly found growing amongst wild rice. Likely you will also find other similar looking and closely related species. When in doubt, collect the whole plant for later identification.

Rare or Endangered Plants

If possible, identify plants in the field without removing them from the sediment in order to keep the plant community intact and because many aquatic plants are relatively rare. In some cases, removing a small part of the plant for closer inspection, such as a leaf or flower, will allow for identification. If it is not possible to identify the plant in the field and you are concerned that it may be rare or endangered, you may wish to photograph it rather than collecting it.

Plants of Special Concern

Reasons to collect data about other plants growing with wild rice include identifying and locating plants of special concern. These plants may outcompete wild rice or cause other issues, such as recreational water use problems. The resource manager should identify any species of special concern. Plants that are categorized by the Minnesota Department of Natural Resources as "invasive" are noted below.

Field crews should note plants of special concern within the water body where they are sampling. Record the plant's name in column 3 of the Field Data Sheet when found within the quadrat. If found growing outside the quadrat, also make note of its presence in a separate area, such as in the field notes on the second page of the Field Data Sheet. Photograph the plant and collect a sample plant for identification in the lab. In order to relocate the site where plants are growing, identify the site by recording a GPS point or indicate the location on a map.[3]

[3]For more about threats from plant competition, see "Natural Wild Rice in Minnesota," a wild rice study document submitted to the Minnesota Legislature by the Minnesota Department of Natural Resources, February 15, 2008.

Arrowhead,
Sagittaria latifolia

Bulrush, Hard-stem,
Schoenoplectus acutus

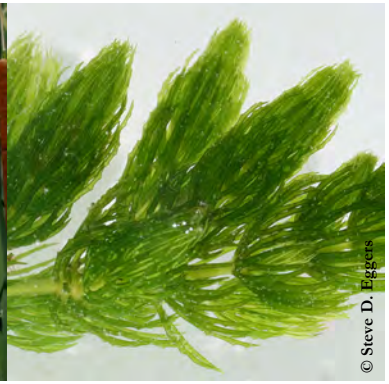
Bulrush, Soft-stem,
Schoenoplectus validus

Burreed, Giant,
Sparganium eurycarpum

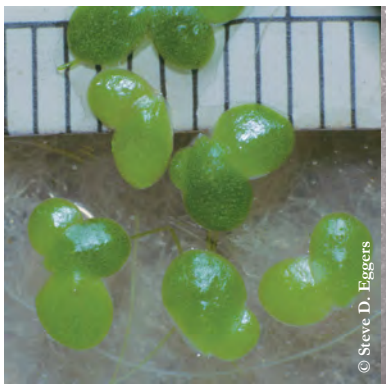
Cattail, Narrow-leaved,
Typha angustifolia
Note: Introduced

Cattail, Broad-leaved,
Typha latifolia

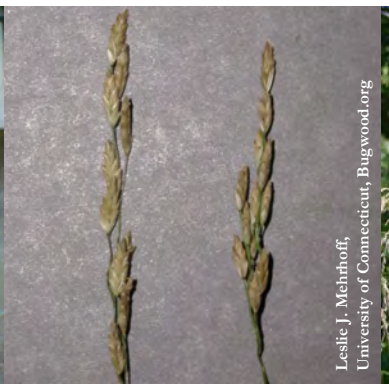
Cattail, Hybrid,
Typha × glauca
Note: Introduced



Coontail,
Ceratophyllum demersum



Duckweed, Lesser,
Lemna minor



Grass, Manna,
Glyceria species*

Grass, Manna,
Glyceria species*

Grass, Reed Canary,
Phalaris arundinacea
Note: Invasive

*There are many species within the genus *Glyceria* that are commonly referred to as "manna grass." Some are native and some are not. Above are examples of *Glyceria maxima*. Record "manna grass" for all similar-looking species due to the difficulty in telling them apart without botanical training.

Horsetail, Water,
Equisetum fluviatile

Loosestrife, Purple,
Lythrum salicaria
Note: Invasive

Lotus,
Nelumbo lutea

Pickerelweed,
Pontederia cordata

Four Common Pondweeds (Record all as "pondweed"), *Potamogeton* species

There are many species within the genus *Potamogeton* that are commonly referred to as "pondweeds." Due to the difficulty in telling the species apart without botanical training, record "pondweeds" for these similar-looking species while monitoring wild rice.

Pondweed, Large-leaved,
Potamogeton amplifolius

Pondweed, Curly,
Potamogeton crispus
Note: Invasive

Pondweed, Floating-leaved,
Potamogeton natans

Pondweed, Leafy,
Potamogeton foliosus

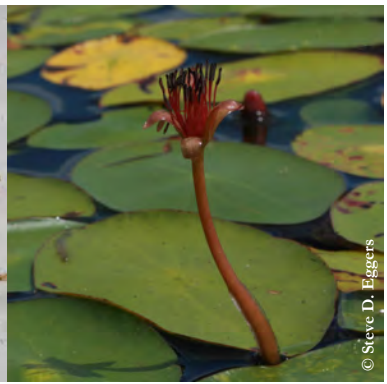
Reed, Common,
Phragmites australis
Note: Invasive

Rush, Flowering,
Butomus umbellatus
Note: Invasive

Smartweed, Water,
Persicaria amphibia

Watermilfoil, Common,
Myriophyllum sibiricum
Note**

Watermilfoil, Eurasian,
Myriophyllum spicatum L.
Note: Invasive, similar to native common watermilfoil (*M. sibiricum*)**



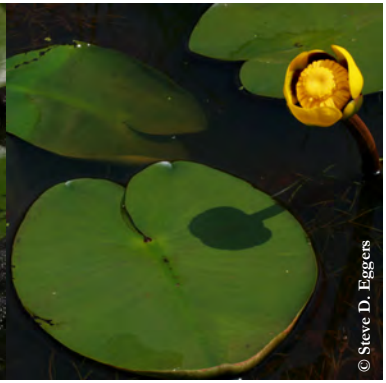
Watershield,
Brassenia schreberi

****How to tell Common Watermilfoil and Eurasian Watermilfoil apart**, *from Eggers and Reed, 2014, p. 43*

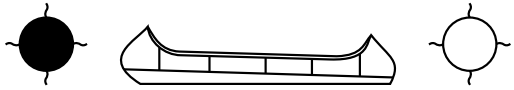
Common Watermilfoil – "Leaves with 5-10 thread-like segments on each side of the midrib; submerged leaves stiff when removed from water."

Eurasian Watermilfoil – "Leaves with 12-22 thread-like segments on each side of the midrib; submerged leaves collapse when removed from the water."

Water Lily, Common White,
Nymphaea odorata



Water Lily, Common Yellow,
Nuphar variegata
Note: Formerly known as
Nuphar lutea



RESOURCES

Among others listed in the *Handbook*, the following aquatic vegetation sampling protocols led to the wild rice monitoring recommendations:

- Downing, I. A., and M. W. Anderson. (1985) Estimating the standing biomass of aquatic macrophytes. Canadian Journal of Fisheries and Aquatic Sciences 42: 1860-1869.
- Madsen, J.D. (1999) Point intercept and line intercept methods for aquatic plant management. Aquatic Plant Control Research Program Technical Note MI-02. U.S. Army Engineer Research and Development Center, 3909 Halls Ferry Road, Vicksburg, MS 39180. 16 p. http://www.wes.army.mil/el/aqua/pdf/apcmi-02.pdf
- Minnesota Department of Natural Resources. (2012) Minnesota's Sensitive Lakeshore Identification Manual: a conservation strategy for Minnesota lakeshores (version 3). Division of Ecological and Water Resources, Minnesota Department of Natural Resources.
- Perleberg, D., Radomski, P., Simon, S., Carlson, K., and J. Knopik. (2015) Minnesota Lake Plant Survey Manual for use by MNDNR Fisheries Section and EWR Lakes Program. Minnesota Department of Natural Resources Ecological and Water Resources Division, Brainerd, MN. 82 pp. and appendices.
- Uzarski, D.G, Brady, V.J., and M. Cooper. (2014) GLIC: Implementing Great Lakes Coastal Wetland Monitoring. Quality Assurance Project Plan for USEPA project EPAGLNPO-2010-H-3-984-758.
- Vogt, D. (2014) Wild Rice Monitoring and Abundance in the 1854 Ceded Territory (1998-2014). 1854 Treaty Authority, Duluth, MN, 55811. http://www.1854treatyauthority.org/wildrice/

See SOP #3, "Identifying Aquatic Vegetation," in the *Wild Rice Monitoring Handbook* and the following references for information on collecting and identifying aquatic plants:

- Aiken, S.G., Lee, P.F., Punter, D., and J.M. Stewart. (1988) Wild Rice in Canada. NC Press Limited, Toronto, Canada.
- Borman, S., Korth, R., Tempte, J., and C. Watkins. (1997) Through the Looking Glass: A Field Guide to Aquatic Plants. Wisconsin Lakes Partnership, Stevens Point, WI.
- Eggers, S. D., and D. M. Reed. (2014) Wetland Plants and Plant Communities of Minnesota and Wisconsin, Version 3.1. The U.S. Army Corps of Engineers, St. Paul, MN.
- Haynes, R. R. (1984) Techniques for collecting aquatic and marsh plants. Annals of Missouri Botanical Garden 71:229-231.
- Wood, R.D. (1970) Hydrobotanical methods. University Park Press, Baltimore, MD.

WILD RICE FIELD DATA SHEET

Water body name: _____

County: _____ Township: _____ Range: _____ Section(s): _____
Date: _____ Crew: _____ Sheet is #____ of ____ (# of sheets for water body)

Be sure to record the units of measurement you are using!

Sample ID #	# of rice stalks within 0.5 m^2 quadrat	Other vegetation present	SAMPLE PLANT		
			Height ☐ Above water ☐ Total cm / in	Water depth cm / in	# of stalks on plant (if collecting whole plants)

Source: Modified from field data sheet by 1854 Treaty Authority, Duluth, MN (2010).

WILD RICE FIELD NOTES

Water body name: _____

Do not forget to map area occupied by wild rice.

Indicate Sample Point ID #s where appropriate.

Weather conditions (current and past 2-3 days): _____

Plots skipped (record Sample Point ID #s and reason for skipping)

_____

_____

Observed **Shoreline Use** (docks, roads, parking lots, houses, buildings, access points)

_____

_____

_____

Observed **Water Use** (boat traffic, other recreational use)

_____

_____

_____

Potential concerns for wild rice growth (i.e. pollutants, leaking septic systems, runoff or erosion areas, dredging, physical damage, etc.)

_____

_____

_____

Brown Spot Fungal Disease - Record severity level *3-5 times per lake* as "0" if wild rice leaf is free of disease, "low" (less than 1/3 of leaf covered) or "high" (more than 1/3). See the photos on page 19.

Sample Point ID #:	Leaf coverage:	☐ 0 (none)	☐ Low (less than 1/3)	☐ High (more than 1/3)
Sample Point ID #:	Leaf coverage:	☐ 0 (none)	☐ Low (less than 1/3)	☐ High (more than 1/3)
Sample Point ID #:	Leaf coverage:	☐ 0 (none)	☐ Low (less than 1/3)	☐ High (more than 1/3)
Sample Point ID #:	Leaf coverage:	☐ 0 (none)	☐ Low (less than 1/3)	☐ High (more than 1/3)
Sample Point ID #:	Leaf coverage:	☐ 0 (none)	☐ Low (less than 1/3)	☐ High (more than 1/3)

Presence of animals, birds, pathogens, or pests

Type	**Presence (check if present)**	**Comments**
Beaver	☐	
Muskrat	☐	
Rusty Crawfish	☐	
Swans	☐	
Ducks	☐	
Geese	☐	
Rice worms	☐	
Ergots	☐	
Leaf sheath & stem rot	☐	
Unusual seed head shape (bottle brush, crow's foot)	☐	
Other	☐	
Unknown	☐	

WILD RICE FIELD DATA INSTRUCTIONS

1. **Locate sample points using GPS unit.**

2. **Collect water quality and sediment samples, if part of sampling plan.**

3. **Lower the ½ m^2 quadrat frame straight down over the wild rice plants.** When placing the quadrat, if there are any stalks leaning in or out, they should be pulled in or out accordingly. If the sample point doesn't contain wild rice, then measure water depth, document presence of other vegetation, write "0" in the other columns, and move on.

4. **Record number of rice stalks within the quadrat.** Count stalks, not plants.

5. **Identify other plants in the quadrat.** Consider creating abbreviations for names of other vegetation to save space.

6. **Select a sample plant that is nearest a designated corner of the quadrat.**

7. **Measure plant height.** Decide whether you will measure above water plant height or total plant height, and check the box to indicate your choice. (Note: At this point, you should also take into account whether you will eventually collect only seed heads or the entire plant, Step 9.) If measuring above water plant height, measure from the water line to the top of the tallest stem. If measuring total plant height, pull the plant and record measurement from the top of the roots (if 2+ sets, top of the prop root) to the top of the tallest stem (stems have seeds). Circle the unit of measurement.

8. **Measure water depth.** For this measurement, you can either use a Secchi disk or other tool OR, if you pulled the plant, you can measure from the top of the sediment roots or prop roots (if they exist) to the water line. Circle the unit of measurement.

9. **Collect sample to take back to the lab for analysis.** See Step 9 on page 16 of the Field Guide for instructions on collecting wild rice plants. Decide whether you will collect seed heads only or the entire plant. If only collecting seed heads, collect seed heads from every stem on the sample plant. If collecting the entire plant, count and note the number of stalks on the sample plant. Store seed heads or plants on ice until returning to the lab. Be sure to label the bag properly.

10. **Record Field Notes.**

11. **Record brown spot fungal disease severity (randomly at 3-5 points across the waterbody).**

12. **Estimate wild rice stand area.**

Note: Upon returning to the lab, process samples as soon as possible.

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