Appendix \_\_. Diatom Metric Descriptions

**Table \_\_-1**. Metric codes by metric trait category, with calculation type and trait. Refer to Table \_\_-3 for trait definitions.

| **Metric Category** | **Metric** | **Calculation Type** | **Trait** |
| --- | --- | --- | --- |
| Acidity | nt\_pH\_WDEQ\_1 | Taxa Richness | pH\_WDEQ\_1 |
| Acidity | nt\_pH\_WDEQ\_2 | Taxa Richness | pH\_WDEQ\_2 |
| Acidity | nt\_pH\_WDEQ\_3 | Taxa Richness | pH\_WDEQ\_3 |
| Acidity | nt\_pH\_WDEQ\_4 | Taxa Richness | pH\_WDEQ\_4 |
| Acidity | nt\_pH\_WDEQ\_5 | Taxa Richness | pH\_WDEQ\_5 |
| Acidity | nt\_pH\_WDEQ\_6 | Taxa Richness | pH\_WDEQ\_6 |
| Acidity | pi\_pH\_WDEQ\_1 | Percent Abundance | pH\_WDEQ\_1 |
| Acidity | pi\_pH\_WDEQ\_2 | Percent Abundance | pH\_WDEQ\_2 |
| Acidity | pi\_pH\_WDEQ\_3 | Percent Abundance | pH\_WDEQ\_3 |
| Acidity | pi\_pH\_WDEQ\_4 | Percent Abundance | pH\_WDEQ\_4 |
| Acidity | pi\_pH\_WDEQ\_5 | Percent Abundance | pH\_WDEQ\_5 |
| Acidity | pi\_pH\_WDEQ\_6 | Percent Abundance | pH\_WDEQ\_6 |
| Acidity | pt\_pH\_WDEQ\_1 | Relative Richness | pH\_WDEQ\_1 |
| Acidity | pt\_pH\_WDEQ\_2 | Relative Richness | pH\_WDEQ\_2 |
| Acidity | pt\_pH\_WDEQ\_3 | Relative Richness | pH\_WDEQ\_3 |
| Acidity | pt\_pH\_WDEQ\_4 | Relative Richness | pH\_WDEQ\_4 |
| Acidity | pt\_pH\_WDEQ\_5 | Relative Richness | pH\_WDEQ\_5 |
| Acidity | pt\_pH\_WDEQ\_6 | Relative Richness | pH\_WDEQ\_6 |
| Acidity | wa\_OptCat\_pH | Weighted Average | OptCat\_pH |
| Acidity | wa\_pH\_WDEQ | Weighted Average | pH\_WDEQ |
| Biological Condition | BC\_1.pa | Relative Abundance | BC\_1 |
| Biological Condition | BC\_1.pa.res.ELO | Relative Abundance | BC\_1 |
| Biological Condition | BC\_1.pt | Relative Richness | BC\_1 |
| Biological Condition | BC\_1.r | Taxa Richness | BC\_1 |
| Biological Condition | BC\_12.pa | Relative Abundance | BC\_12 |
| Biological Condition | BC\_12.r | Taxa Richness | BC\_12 |
| Biological Condition | BC\_123.r | Taxa Richness | BC\_123 |
| Biological Condition | BC\_2.pa | Relative Abundance | BC\_2 |
| Biological Condition | BC\_2.pt | Relative Richness | BC\_2 |
| Biological Condition | BC\_2.r | Taxa Richness | BC\_2 |
| Biological Condition | BC\_3.pa | Relative Abundance | BC\_3 |
| Biological Condition | BC\_3.pt | Relative Richness | BC\_3 |
| Biological Condition | BC\_3.r | Taxa Richness | BC\_3 |
| Biological Condition | BC\_4.pa | Relative Abundance | BC\_4 |
| Biological Condition | BC\_4.pt | Relative Richness | BC\_4 |
| Biological Condition | BC\_4.r | Taxa Richness | BC\_4 |
| Biological Condition | BC\_4.r.res.WST | Taxa Richness | BC\_4 |
| Biological Condition | BC\_45.pt | Relative Richness | BC\_45 |
| Biological Condition | BC\_45.r | Taxa Richness | BC\_45 |
| Biological Condition | BC\_5.pa | Relative Abundance | BC\_5 |
| Biological Condition | BC\_5.pt | Relative Richness | BC\_5 |
| Biological Condition | BC\_5.r | Taxa Richness | BC\_5 |
| Biological Condition | WA\_BC\_USGS | Weighted Average | BC\_USGS |
| General | ni\_total | Relative Abundance | ni\_total |
| General | nt\_total | Taxa Richness | total |
| General Habit | ADNATE.pa | Relative Abundance | ADNATE |
| General Habit | ADNATE.pt | Relative Richness | ADNATE |
| General Habit | ADNATE.r | Taxa Richness | ADNATE |
| General Habit | ARAPHID.pa | Relative Abundance | ARAPHID |
| General Habit | ARAPHID.pt | Relative Richness | ARAPHID |
| General Habit | ARAPHID.r | Taxa Richness | ARAPHID |
| General Habit | BENTHIC\_HABIT.pa | Relative Abundance | BENTHIC\_HABIT |
| General Habit | BENTHIC\_HABIT.pt | Relative Richness | BENTHIC\_HABIT |
| General Habit | BENTHIC\_HABIT.r | Taxa Richness | BENTHIC\_HABIT |
| General Habit | CENTRIC.pa | Relative Abundance | CENTRIC |
| General Habit | CENTRIC.pt | Relative Richness | CENTRIC |
| General Habit | CENTRIC.pt.ELO | Relative Richness | CENTRIC |
| General Habit | CENTRIC.r | Taxa Richness | CENTRIC |
| General Habit | nt\_Ben\_Ses\_1 | Taxa Richness | Ben\_Ses\_1 |
| General Habit | nt\_Ben\_Ses\_2 | Taxa Richness | Ben\_Ses\_2 |
| General Habit | nt\_M\_WDEQ\_1 | Taxa Richness | M\_WDEQ\_1 |
| General Habit | nt\_M\_WDEQ\_12 | Taxa Richness | M\_WDEQ\_12 |
| General Habit | nt\_M\_WDEQ\_2 | Taxa Richness | M\_WDEQ\_2 |
| General Habit | nt\_M\_WDEQ\_3 | Taxa Richness | M\_WDEQ\_3 |
| General Habit | nt\_M\_WDEQ\_4 | Taxa Richness | M\_WDEQ\_4 |
| General Habit | nt\_M\_WDEQ\_5 | Taxa Richness | M\_WDEQ\_5 |
| General Habit | pi\_Ben\_Ses\_1 | Percent Abundance | Ben\_Ses\_1 |
| General Habit | pi\_Ben\_Ses\_2 | Percent Abundance | Ben\_Ses\_2 |
| General Habit | pi\_M\_WDEQ\_1 | Percent Abundance | M\_WDEQ\_1 |
| General Habit | pi\_M\_WDEQ\_12 | Percent Abundance | M\_WDEQ\_12 |
| General Habit | pi\_M\_WDEQ\_2 | Percent Abundance | M\_WDEQ\_2 |
| General Habit | pi\_M\_WDEQ\_3 | Percent Abundance | M\_WDEQ\_3 |
| General Habit | pi\_M\_WDEQ\_4 | Percent Abundance | M\_WDEQ\_4 |
| General Habit | pi\_M\_WDEQ\_5 | Percent Abundance | M\_WDEQ\_5 |
| General Habit | pi\_Pioneer | Percent Abundance | Pioneer |
| General Habit | pi\_TubeDwellers | Percent Abundance | TubeDwellers |
| General Habit | pt\_Ben\_Ses\_1 | Relative Richness | Ben\_Ses\_1 |
| General Habit | pt\_Ben\_Ses\_2 | Relative Richness | Ben\_Ses\_2 |
| General Habit | pt\_HiProfile | Relative Richness | HiProfile |
| General Habit | pt\_M\_WDEQ\_1 | Relative Richness | M\_WDEQ\_1 |
| General Habit | pt\_M\_WDEQ\_2 | Relative Richness | M\_WDEQ\_2 |
| General Habit | pt\_M\_WDEQ\_3 | Relative Richness | M\_WDEQ\_3 |
| General Habit | pt\_M\_WDEQ\_4 | Relative Richness | M\_WDEQ\_4 |
| General Habit | pt\_M\_WDEQ\_5 | Relative Richness | M\_WDEQ\_5 |
| General Habit | pt\_Planktonic | Relative Richness | Planktonic |
| General Habit | SESTONIC\_HABIT.pa | Relative Abundance | SESTONIC\_HABIT |
| General Habit | SESTONIC\_HABIT.pt | Relative Richness | SESTONIC\_HABIT |
| General Habit | SESTONIC\_HABIT.r | Taxa Richness | SESTONIC\_HABIT |
| General Habit | STALKED.pa | Relative Abundance | STALKED |
| General Habit | STALKED.pt | Relative Richness | STALKED |
| General Habit | STALKED.pt.WST | Relative Richness | STALKED.WST |
| General Habit | STALKED.r | Taxa Richness | STALKED |
| General Habit | wa\_M\_WDEQ | Weighted Average | M\_WDEQ |
| General Habit | wa\_OptCat\_PctFN | Weighted Average | OptCat\_PctFN |
| General Habit | wa\_OptCat\_XEMBED | Weighted Average | OptCat\_XEMBED |
| Index | Nat\_MMI | Index | Nat\_MMI |
| Index | wa\_OptCat\_DisTotMMI | Weighted Average | OptCat\_DisTotMMI |
| Index | wa\_OptCat\_L1DisTot | Weighted Average | OptCat\_L1DisTot |
| Motility | HIGHLY\_MOTILE.1.pa | Relative Abundance | HIGHLY\_MOTILE.1 |
| Motility | HIGHLY\_MOTILE.1.pt | Relative Richness | HIGHLY\_MOTILE.1 |
| Motility | HIGHLY\_MOTILE.1.r | Taxa Richness | HIGHLY\_MOTILE.1 |
| Motility | HIGHLY\_MOTILE.pa | Relative Abundance | HIGHLY\_MOTILE |
| Motility | HIGHLY\_MOTILE.pa.res.ELO | Relative Abundance | HIGHLY\_MOTILE |
| Motility | HIGHLY\_MOTILE.pt | Relative Richness | HIGHLY\_MOTILE |
| Motility | HIGHLY\_MOTILE.r | Taxa Richness | HIGHLY\_MOTILE |
| Motility | MODERATELY\_MOTILE.pa | Relative Abundance | MODERATELY\_MOTILE |
| Motility | MODERATELY\_MOTILE.pt | Relative Richness | MODERATELY\_MOTILE |
| Motility | MODERATELY\_MOTILE.r | Taxa Richness | MODERATELY\_MOTILE |
| Motility | NON\_MOTILE.pa | Relative Abundance | NON\_MOTILE |
| Motility | NON\_MOTILE.pt | Relative Richness | NON\_MOTILE |
| Motility | NON\_MOTILE.r | Taxa Richness | NON\_MOTILE |
| Motility | SLIGHTLY\_MOTILE.pa | Relative Abundance | SLIGHTLY\_MOTILE |
| Motility | SLIGHTLY\_MOTILE.pt | Relative Richness | SLIGHTLY\_MOTILE |
| Motility | SLIGHTLY\_MOTILE.r | Taxa Richness | SLIGHTLY\_MOTILE |
| Motility | WA\_Motility\_USGS | Weighted Average | Motility\_USGS |
| Motility | WEAKLY\_MOTILE.pa | Relative Abundance | WEAKLY\_MOTILE |
| Motility | WEAKLY\_MOTILE.pt | Relative Richness | WEAKLY\_MOTILE |
| Motility | WEAKLY\_MOTILE.r | Taxa Richness | WEAKLY\_MOTILE |
| Motility | WEAKLY\_MOTILE.r.WST | Taxa Richness | WEAKLY\_MOTILE |
| Nitrogen Fixation | N\_FIXER.pa | Relative Abundance | N\_FIXER |
| Nitrogen Fixation | N\_FIXER.pt | Relative Richness | N\_FIXER |
| Nitrogen Fixation | N\_FIXER.r | Taxa Richness | N\_FIXER |
| Nitrogen Fixation | NON\_N\_FIXER.pa | Relative Abundance | NON\_N\_FIXER |
| Nitrogen Fixation | NON\_N\_FIXER.pt | Relative Richness | NON\_N\_FIXER |
| Nitrogen Fixation | NON\_N\_FIXER.r | Taxa Richness | NON\_N\_FIXER |
| Nitrogen Fixation | pi\_NFixers | Percent Abundance | NFixers |
| Nutrient Status | HIGH\_N.pa | Relative Abundance | HIGH\_N |
| Nutrient Status | HIGH\_N.pa.res.WST | Relative Abundance | HIGH\_N |
| Nutrient Status | HIGH\_N.pt | Relative Richness | HIGH\_N |
| Nutrient Status | HIGH\_N.r | Taxa Richness | HIGH\_N |
| Nutrient Status | HIGH\_P.pa | Relative Abundance | HIGH\_P |
| Nutrient Status | HIGH\_P.pt | Relative Richness | HIGH\_P |
| Nutrient Status | HIGH\_P.r | Taxa Richness | HIGH\_P |
| Nutrient Status | LOW\_N.pa | Relative Abundance | LOW\_N |
| Nutrient Status | LOW\_N.pt | Relative Richness | LOW\_N |
| Nutrient Status | LOW\_N.r | Taxa Richness | LOW\_N |
| Nutrient Status | LOW\_P.pa | Relative Abundance | LOW\_P |
| Nutrient Status | LOW\_P.pt | Relative Richness | LOW\_P |
| Nutrient Status | LOW\_P.r | Taxa Richness | LOW\_P |
| Nutrient Status | LOW\_P.r.res.ELO | Taxa Richness | LOW\_P |
| Nutrient Status | nt\_Diat\_Ca\_1 | Taxa Richness | Diat\_Ca\_1 |
| Nutrient Status | nt\_Diat\_Ca\_2 | Taxa Richness | Diat\_Ca\_2 |
| Nutrient Status | nt\_Diatas\_TN\_1 | Taxa Richness | Diatas\_TN\_1 |
| Nutrient Status | nt\_Diatas\_TN\_2 | Taxa Richness | Diatas\_TN\_2 |
| Nutrient Status | nt\_Diatas\_TP\_1 | Taxa Richness | Diatas\_TP\_1 |
| Nutrient Status | nt\_Diatas\_TP\_2 | Taxa Richness | Diatas\_TP\_2 |
| Nutrient Status | nt\_N\_WDEQ\_1 | Taxa Richness | N\_WDEQ\_1 |
| Nutrient Status | nt\_N\_WDEQ\_2 | Taxa Richness | N\_WDEQ\_2 |
| Nutrient Status | nt\_N\_WDEQ\_3 | Taxa Richness | N\_WDEQ\_3 |
| Nutrient Status | nt\_N\_WDEQ\_34 | Taxa Richness | N\_WDEQ\_34 |
| Nutrient Status | nt\_N\_WDEQ\_4 | Taxa Richness | N\_WDEQ\_4 |
| Nutrient Status | pi\_Diat\_CA\_1 | Percent Abundance | Diat\_CA\_1 |
| Nutrient Status | pi\_Diat\_CA\_2 | Percent Abundance | Diat\_CA\_2 |
| Nutrient Status | pi\_Diatas\_TN\_1 | Percent Abundance | Diatas\_TN\_1 |
| Nutrient Status | pi\_Diatas\_TN\_2 | Percent Abundance | Diatas\_TN\_2 |
| Nutrient Status | pi\_Diatas\_TP\_1 | Percent Abundance | Diatas\_TP\_1 |
| Nutrient Status | pi\_Diatas\_TP\_2 | Percent Abundance | Diatas\_TP\_2 |
| Nutrient Status | pi\_N\_WDEQ\_1 | Percent Abundance | N\_WDEQ\_1 |
| Nutrient Status | pi\_N\_WDEQ\_12 | Percent Abundance | N\_WDEQ\_12 |
| Nutrient Status | pi\_N\_WDEQ\_2 | Percent Abundance | N\_WDEQ\_2 |
| Nutrient Status | pi\_N\_WDEQ\_3 | Percent Abundance | N\_WDEQ\_3 |
| Nutrient Status | pi\_N\_WDEQ\_34 | Percent Abundance | N\_WDEQ\_34 |
| Nutrient Status | pi\_N\_WDEQ\_4 | Percent Abundance | N\_WDEQ\_4 |
| Nutrient Status | pt\_Diat\_CA\_1 | Relative Richness | Diat\_CA\_1 |
| Nutrient Status | pt\_Diat\_CA\_2 | Relative Richness | Diat\_CA\_2 |
| Nutrient Status | pt\_Diatas\_TN\_1 | Relative Richness | Diatas\_TN\_1 |
| Nutrient Status | pt\_Diatas\_TN\_2 | Relative Richness | Diatas\_TN\_2 |
| Nutrient Status | pt\_Diatas\_TP\_1 | Relative Richness | Diatas\_TP\_1 |
| Nutrient Status | pt\_Diatas\_TP\_2 | Relative Richness | Diatas\_TP\_2 |
| Nutrient Status | pt\_N\_WDEQ\_1 | Relative Richness | N\_WDEQ\_1 |
| Nutrient Status | pt\_N\_WDEQ\_12 | Relative Richness | N\_WDEQ\_12 |
| Nutrient Status | pt\_N\_WDEQ\_2 | Relative Richness | N\_WDEQ\_2 |
| Nutrient Status | pt\_N\_WDEQ\_3 | Relative Richness | N\_WDEQ\_3 |
| Nutrient Status | pt\_N\_WDEQ\_34 | Relative Richness | N\_WDEQ\_34 |
| Nutrient Status | pt\_N\_WDEQ\_4 | Relative Richness | N\_WDEQ\_4 |
| Nutrient Status | wa\_N\_WDEQ | Weighted Average | N\_WDEQ |
| Nutrient Status | wa\_OptCat\_L1Ptl | Weighted Average | OptCat\_L1Ptl |
| Nutrient Status | wa\_OptCat\_LNtl | Weighted Average | OptCat\_LNtl |
| Nutrient Status | wa\_OptCat\_NutMMI | Weighted Average | OptCat\_NutMMI |
| Oxygen Affinity | nt\_O\_WDEQ\_1 | Taxa Richness | O\_WDEQ\_1 |
| Oxygen Affinity | nt\_O\_WDEQ\_2 | Taxa Richness | O\_WDEQ\_2 |
| Oxygen Affinity | nt\_O\_WDEQ\_3 | Taxa Richness | O\_WDEQ\_3 |
| Oxygen Affinity | nt\_O\_WDEQ\_34 | Taxa Richness | O\_WDEQ\_34 |
| Oxygen Affinity | nt\_O\_WDEQ\_4 | Taxa Richness | O\_WDEQ\_4 |
| Oxygen Affinity | O\_1.pa | Relative Abundance | O\_1 |
| Oxygen Affinity | O\_1.pt | Relative Richness | O\_1 |
| Oxygen Affinity | O\_1.r | Taxa Richness | O\_1 |
| Oxygen Affinity | O\_2.pa | Relative Abundance | O\_2 |
| Oxygen Affinity | O\_2.pt | Relative Richness | O\_2 |
| Oxygen Affinity | O\_2.r | Taxa Richness | O\_2 |
| Oxygen Affinity | O\_3.pa | Relative Abundance | O\_3 |
| Oxygen Affinity | O\_3.pt | Relative Richness | O\_3 |
| Oxygen Affinity | O\_3.r | Taxa Richness | O\_3 |
| Oxygen Affinity | O\_4.pa | Relative Abundance | O\_4 |
| Oxygen Affinity | O\_4.pt | Relative Richness | O\_4 |
| Oxygen Affinity | O\_4.r | Taxa Richness | O\_4 |
| Oxygen Affinity | O\_45.pt | Relative Richness | O\_45 |
| Oxygen Affinity | O\_5.pa | Relative Abundance | O\_5 |
| Oxygen Affinity | O\_5.pt | Relative Richness | O\_5 |
| Oxygen Affinity | O\_5.r | Taxa Richness | O\_5 |
| Oxygen Affinity | pi\_O\_WDEQ\_1 | Percent Abundance | O\_WDEQ\_1 |
| Oxygen Affinity | pi\_O\_WDEQ\_12 | Percent Abundance | O\_WDEQ\_12 |
| Oxygen Affinity | pi\_O\_WDEQ\_2 | Percent Abundance | O\_WDEQ\_2 |
| Oxygen Affinity | pi\_O\_WDEQ\_3 | Percent Abundance | O\_WDEQ\_3 |
| Oxygen Affinity | pi\_O\_WDEQ\_34 | Percent Abundance | O\_WDEQ\_34 |
| Oxygen Affinity | pi\_O\_WDEQ\_4 | Percent Abundance | O\_WDEQ\_4 |
| Oxygen Affinity | pt\_O\_WDEQ\_1 | Relative Richness | O\_WDEQ\_1 |
| Oxygen Affinity | pt\_O\_WDEQ\_12 | Relative Richness | O\_WDEQ\_12 |
| Oxygen Affinity | pt\_O\_WDEQ\_2 | Relative Richness | O\_WDEQ\_2 |
| Oxygen Affinity | pt\_O\_WDEQ\_3 | Relative Richness | O\_WDEQ\_3 |
| Oxygen Affinity | pt\_O\_WDEQ\_34 | Relative Richness | O\_WDEQ\_34 |
| Oxygen Affinity | pt\_O\_WDEQ\_4 | Relative Richness | O\_WDEQ\_4 |
| Oxygen Affinity | wa\_O\_WDEQ | Weighted Average | O\_WDEQ |
| Pollution Tolerance | Bahls\_1.pa | Relative Abundance | Bahls\_1 |
| Pollution Tolerance | Bahls\_1.pt | Relative Richness | Bahls\_1 |
| Pollution Tolerance | Bahls\_1.r | Taxa Richness | Bahls\_1 |
| Pollution Tolerance | Bahls\_12.pt | Relative Richness | Bahls\_12 |
| Pollution Tolerance | Bahls\_2.pa | Relative Abundance | Bahls\_2 |
| Pollution Tolerance | Bahls\_2.pt | Relative Richness | Bahls\_2 |
| Pollution Tolerance | Bahls\_2.r | Taxa Richness | Bahls\_2 |
| Pollution Tolerance | Bahls\_3.pa | Relative Abundance | Bahls\_3 |
| Pollution Tolerance | Bahls\_3.pt | Relative Richness | Bahls\_3 |
| Pollution Tolerance | Bahls\_3.r | Taxa Richness | Bahls\_3 |
| Pollution Tolerance | PT\_1.pa | Relative Abundance | PT\_1 |
| Pollution Tolerance | PT\_1.pt | Relative Richness | PT\_1 |
| Pollution Tolerance | PT\_1.r | Taxa Richness | PT\_1 |
| Pollution Tolerance | PT\_12.pt | Relative Richness | PT\_12 |
| Pollution Tolerance | PT\_2.pa | Relative Abundance | PT\_2 |
| Pollution Tolerance | PT\_2.pt | Relative Richness | PT\_2 |
| Pollution Tolerance | PT\_2.r | Taxa Richness | PT\_2 |
| Pollution Tolerance | PT\_3.pa | Relative Abundance | PT\_3 |
| Pollution Tolerance | PT\_3.pt | Relative Richness | PT\_3 |
| Pollution Tolerance | PT\_3.r | Taxa Richness | PT\_3 |
| Pollution Tolerance | PT\_4.pa | Relative Abundance | PT\_4 |
| Pollution Tolerance | PT\_4.pt | Relative Richness | PT\_4 |
| Pollution Tolerance | PT\_4.r | Taxa Richness | PT\_4 |
| Pollution Tolerance | PT\_5.pa | Relative Abundance | PT\_5 |
| Pollution Tolerance | PT\_5.pt | Relative Richness | PT\_5 |
| Pollution Tolerance | PT\_5.r | Taxa Richness | PT\_5 |
| Pollution Tolerance | WA\_Bahls\_USGS | Weighted Average | Bahls\_USGS |
| Pollution Tolerance | WA\_PT\_USGS | Weighted Average | USGS |
| Pollution Tolerance | wa\_PTI\_WDEQ | Weighted Average | PTI\_WDEQ |
| Salinity | nt\_Diat\_Cl\_1 | Taxa Richness | Diat\_Cl\_1 |
| Salinity | nt\_Diat\_Cl\_2 | Taxa Richness | Diat\_Cl\_2 |
| Salinity | nt\_Diat\_Cond\_1 | Taxa Richness | Diat\_Cond\_1 |
| Salinity | nt\_Diat\_Cond\_2 | Taxa Richness | Diat\_Cond\_2 |
| Salinity | nt\_H\_WDEQ\_1 | Taxa Richness | H\_WDEQ\_1 |
| Salinity | nt\_H\_WDEQ\_2 | Taxa Richness | H\_WDEQ\_2 |
| Salinity | nt\_H\_WDEQ\_3 | Taxa Richness | H\_WDEQ\_3 |
| Salinity | nt\_H\_WDEQ\_34 | Taxa Richness | H\_WDEQ\_34 |
| Salinity | nt\_H\_WDEQ\_4 | Taxa Richness | H\_WDEQ\_4 |
| Salinity | pi\_Diat\_CL\_1 | Percent Abundance | Diat\_CL\_1 |
| Salinity | pi\_Diat\_CL\_2 | Percent Abundance | Diat\_CL\_2 |
| Salinity | pi\_Diat\_Cond\_1 | Percent Abundance | Diat\_Cond\_1 |
| Salinity | pi\_Diat\_Cond\_2 | Percent Abundance | Diat\_Cond\_2 |
| Salinity | pi\_H\_WDEQ\_1 | Percent Abundance | H\_WDEQ\_1 |
| Salinity | pi\_H\_WDEQ\_12 | Percent Abundance | H\_WDEQ\_12 |
| Salinity | pi\_H\_WDEQ\_2 | Percent Abundance | H\_WDEQ\_2 |
| Salinity | pi\_H\_WDEQ\_3 | Percent Abundance | H\_WDEQ\_3 |
| Salinity | pi\_H\_WDEQ\_34 | Percent Abundance | H\_WDEQ\_34 |
| Salinity | pi\_H\_WDEQ\_4 | Percent Abundance | H\_WDEQ\_4 |
| Salinity | pt\_Diat\_CL\_1 | Relative Richness | Diat\_CL\_1 |
| Salinity | pt\_Diat\_CL\_2 | Relative Richness | Diat\_CL\_2 |
| Salinity | pt\_Diat\_Cond\_1 | Relative Richness | Diat\_Cond\_1 |
| Salinity | pt\_Diat\_Cond\_2 | Relative Richness | Diat\_Cond\_2 |
| Salinity | pt\_H\_WDEQ\_1 | Relative Richness | H\_WDEQ\_1 |
| Salinity | pt\_H\_WDEQ\_2 | Relative Richness | H\_WDEQ\_2 |
| Salinity | pt\_H\_WDEQ\_3 | Relative Richness | H\_WDEQ\_3 |
| Salinity | pt\_H\_WDEQ\_34 | Relative Richness | H\_WDEQ\_34 |
| Salinity | pt\_H\_WDEQ\_4 | Relative Richness | H\_WDEQ\_4 |
| Salinity | SALINITY\_1.pa | Relative Abundance | SALINITY\_1 |
| Salinity | SALINITY\_1.pt | Relative Richness | SALINITY\_1 |
| Salinity | SALINITY\_1.r | Taxa Richness | SALINITY\_1 |
| Salinity | SALINITY\_2.pa | Relative Abundance | SALINITY\_2 |
| Salinity | SALINITY\_2.pt | Relative Richness | SALINITY\_2 |
| Salinity | SALINITY\_2.r | Taxa Richness | SALINITY\_2 |
| Salinity | SALINITY\_3.pa | Relative Abundance | SALINITY\_3 |
| Salinity | SALINITY\_3.pt | Relative Richness | SALINITY\_3 |
| Salinity | SALINITY\_3.pt.res.ELO | Relative Richness | SALINITY\_3 |
| Salinity | SALINITY\_3.pt.WST | Relative Richness | SALINITY\_3 |
| Salinity | SALINITY\_3.r | Taxa Richness | SALINITY\_3 |
| Salinity | SALINITY\_34.pt | Relative Richness | SALINITY\_34 |
| Salinity | SALINITY\_4.pa | Relative Abundance | SALINITY\_4 |
| Salinity | SALINITY\_4.pt | Relative Richness | SALINITY\_4 |
| Salinity | SALINITY\_4.r | Taxa Richness | SALINITY\_4 |
| Salinity | wa\_H\_WDEQ | Weighted Average | H\_WDEQ |
| Salinity | wa\_OptCat\_LCond | Weighted Average | OptCat\_LCond |
| Salinity | WA\_Salinity\_USGS | Weighted Average | Salinity\_USGS |
| Saprobity | nt\_S\_WDEQ\_1 | Taxa Richness | S\_WDEQ\_1 |
| Saprobity | nt\_S\_WDEQ\_2 | Taxa Richness | S\_WDEQ\_2 |
| Saprobity | nt\_S\_WDEQ\_3 | Taxa Richness | S\_WDEQ\_3 |
| Saprobity | nt\_S\_WDEQ\_4 | Taxa Richness | S\_WDEQ\_4 |
| Saprobity | nt\_S\_WDEQ\_5 | Taxa Richness | S\_WDEQ\_5 |
| Saprobity | pi\_S\_WDEQ\_1 | Percent Abundance | S\_WDEQ\_1 |
| Saprobity | pi\_S\_WDEQ\_12 | Percent Abundance | S\_WDEQ\_12 |
| Saprobity | pi\_S\_WDEQ\_2 | Percent Abundance | S\_WDEQ\_2 |
| Saprobity | pi\_S\_WDEQ\_3 | Percent Abundance | S\_WDEQ\_3 |
| Saprobity | pi\_S\_WDEQ\_345 | Percent Abundance | S\_WDEQ\_345 |
| Saprobity | pi\_S\_WDEQ\_4 | Percent Abundance | S\_WDEQ\_4 |
| Saprobity | pi\_S\_WDEQ\_5 | Percent Abundance | S\_WDEQ\_5 |
| Saprobity | pt\_S\_WDEQ\_1 | Relative Richness | S\_WDEQ\_1 |
| Saprobity | pt\_S\_WDEQ\_2 | Relative Richness | S\_WDEQ\_2 |
| Saprobity | pt\_S\_WDEQ\_3 | Relative Richness | S\_WDEQ\_3 |
| Saprobity | pt\_S\_WDEQ\_345 | Relative Richness | S\_WDEQ\_345 |
| Saprobity | pt\_S\_WDEQ\_4 | Relative Richness | S\_WDEQ\_4 |
| Saprobity | pt\_S\_WDEQ\_5 | Relative Richness | S\_WDEQ\_5 |
| Saprobity | SAP\_1.pa | Relative Abundance | SAP\_1 |
| Saprobity | SAP\_1.pt | Relative Richness | SAP\_1 |
| Saprobity | SAP\_1.r | Taxa Richness | SAP\_1 |
| Saprobity | SAP\_2.pa | Relative Abundance | SAP\_2 |
| Saprobity | SAP\_2.pt | Relative Richness | SAP\_2 |
| Saprobity | SAP\_2.r | Taxa Richness | SAP\_2 |
| Saprobity | SAP\_3.pa | Relative Abundance | SAP\_3 |
| Saprobity | SAP\_3.pt | Relative Richness | SAP\_3 |
| Saprobity | SAP\_3.r | Taxa Richness | SAP\_3 |
| Saprobity | SAP\_4.pa | Relative Abundance | SAP\_4 |
| Saprobity | SAP\_4.pt | Relative Richness | SAP\_4 |
| Saprobity | SAP\_4.r | Taxa Richness | SAP\_4 |
| Saprobity | SAP\_45.pa | Relative Abundance | SAP\_45 |
| Saprobity | SAP\_45.pt | Relative Richness | SAP\_45 |
| Saprobity | SAP\_5.pa | Relative Abundance | SAP\_5 |
| Saprobity | SAP\_5.pt | Relative Richness | SAP\_5 |
| Saprobity | SAP\_5.r | Taxa Richness | SAP\_5 |
| Saprobity | wa\_S\_WDEQ | Weighted Average | S\_WDEQ |
| Saprobity | WA\_SAP\_USGS | Weighted Average | SAP\_USGS |
| Size | BIG.pa | Relative Abundance | BIG |
| Size | BIG.pt | Relative Richness | BIG |
| Size | BIG.r | Taxa Richness | BIG |
| Size | MEDIUM.pa | Relative Abundance | MEDIUM |
| Size | MEDIUM.pt | Relative Richness | MEDIUM |
| Size | MEDIUM.r | Taxa Richness | MEDIUM |
| Size | SMALL.pa | Relative Abundance | SMALL |
| Size | SMALL.pt | Relative Richness | SMALL |
| Size | SMALL.r | Taxa Richness | SMALL |
| Size | VERY\_BIG.pa | Relative Abundance | VERY\_BIG |
| Size | VERY\_BIG.pt | Relative Richness | VERY\_BIG |
| Size | VERY\_BIG.r | Taxa Richness | VERY\_BIG |
| Size | VERY\_SMALL.pa | Relative Abundance | VERY\_SMALL |
| Size | VERY\_SMALL.pt | Relative Richness | VERY\_SMALL |
| Size | VERY\_SMALL.r | Taxa Richness | VERY\_SMALL |
| Size | WA\_Size\_USGS | Weighted Average | Size\_USGS |
| TaxaCategory | ACHNANTHIDIAE.pa | Relative Abundance | ACHNANTHIDIAE |
| TaxaCategory | ACHNANTHIDIAE.pa.res.WST | Relative Abundance | ACHNANTHIDIAE |
| TaxaCategory | ACHNANTHIDIAE.pt | Relative Richness | ACHNANTHIDIAE |
| TaxaCategory | ACHNANTHIDIAE.r | Taxa Richness | ACHNANTHIDIAE |
| TaxaCategory | ACHNANTHIDIUM.pa | Relative Abundance | ACHNANTHIDIUM |
| TaxaCategory | ACHNANTHIDIUM.pt | Relative Richness | ACHNANTHIDIUM |
| TaxaCategory | ACHNANTHIDIUM.r | Taxa Richness | ACHNANTHIDIUM |
| TaxaCategory | BACILLARIACEAE.pa | Relative Abundance | BACILLARIACEAE |
| TaxaCategory | BACILLARIACEAE.pt | Relative Richness | BACILLARIACEAE |
| TaxaCategory | BACILLARIACEAE.r | Taxa Richness | BACILLARIACEAE |
| TaxaCategory | NAVICULA.pa | Relative Abundance | NAVICULA |
| TaxaCategory | NAVICULA.pt | Relative Richness | NAVICULA |
| TaxaCategory | NAVICULA.r | Taxa Richness | NAVICULA |
| TaxaCategory | pi\_Cyclotella | Percent Abundance | Cyclotella |
| TaxaCategory | pi\_Melosira | Percent Abundance | Melosira |
| TaxaCategory | pi\_Surirella | Percent Abundance | Surirella |
| TaxaCategory | pt\_Cymbella | Relative Richness | Cymbella |
| Trophic | nt\_T\_WDEQ\_1 | Taxa Richness | T\_WDEQ\_1 |
| Trophic | nt\_T\_WDEQ\_12 | Taxa Richness | T\_WDEQ\_12 |
| Trophic | nt\_T\_WDEQ\_123 | Taxa Richness | T\_WDEQ\_123 |
| Trophic | nt\_T\_WDEQ\_2 | Taxa Richness | T\_WDEQ\_2 |
| Trophic | nt\_T\_WDEQ\_3 | Taxa Richness | T\_WDEQ\_3 |
| Trophic | nt\_T\_WDEQ\_4 | Taxa Richness | T\_WDEQ\_4 |
| Trophic | nt\_T\_WDEQ\_5 | Taxa Richness | T\_WDEQ\_5 |
| Trophic | nt\_T\_WDEQ\_6 | Taxa Richness | T\_WDEQ\_6 |
| Trophic | nt\_T\_WDEQ\_7 | Taxa Richness | T\_WDEQ\_7 |
| Trophic | pi\_T\_WDEQ\_1 | Percent Abundance | T\_WDEQ\_1 |
| Trophic | pi\_T\_WDEQ\_123 | Percent Abundance | T\_WDEQ\_123 |
| Trophic | pi\_T\_WDEQ\_2 | Percent Abundance | T\_WDEQ\_2 |
| Trophic | pi\_T\_WDEQ\_3 | Percent Abundance | T\_WDEQ\_3 |
| Trophic | pi\_T\_WDEQ\_4 | Percent Abundance | T\_WDEQ\_4 |
| Trophic | pi\_T\_WDEQ\_5 | Percent Abundance | T\_WDEQ\_5 |
| Trophic | pi\_T\_WDEQ\_6 | Percent Abundance | T\_WDEQ\_6 |
| Trophic | pi\_T\_WDEQ\_7 | Percent Abundance | T\_WDEQ\_7 |
| Trophic | pt\_T\_WDEQ\_1 | Relative Richness | T\_WDEQ\_1 |
| Trophic | pt\_T\_WDEQ\_12 | Relative Richness | T\_WDEQ\_12 |
| Trophic | pt\_T\_WDEQ\_123 | Relative Richness | T\_WDEQ\_123 |
| Trophic | pt\_T\_WDEQ\_2 | Relative Richness | T\_WDEQ\_2 |
| Trophic | pt\_T\_WDEQ\_3 | Relative Richness | T\_WDEQ\_3 |
| Trophic | pt\_T\_WDEQ\_4 | Relative Richness | T\_WDEQ\_4 |
| Trophic | pt\_T\_WDEQ\_5 | Relative Richness | T\_WDEQ\_5 |
| Trophic | pt\_T\_WDEQ\_56 | Relative Richness | T\_WDEQ\_56 |
| Trophic | pt\_T\_WDEQ\_6 | Relative Richness | T\_WDEQ\_6 |
| Trophic | pt\_T\_WDEQ\_7 | Relative Richness | T\_WDEQ\_7 |
| Trophic | TROPHIC\_1.pa | Relative Abundance | TROPHIC\_1 |
| Trophic | TROPHIC\_1.pt | Relative Richness | TROPHIC\_1 |
| Trophic | TROPHIC\_1.r | Taxa Richness | TROPHIC\_1 |
| Trophic | TROPHIC\_123.pa | Relative Abundance | TROPHIC\_123 |
| Trophic | TROPHIC\_2.pa | Relative Abundance | TROPHIC\_2 |
| Trophic | TROPHIC\_2.pt | Relative Richness | TROPHIC\_2 |
| Trophic | TROPHIC\_2.r | Taxa Richness | TROPHIC\_2 |
| Trophic | TROPHIC\_3.pa | Relative Abundance | TROPHIC\_3 |
| Trophic | TROPHIC\_3.pt | Relative Richness | TROPHIC\_3 |
| Trophic | TROPHIC\_3.r | Taxa Richness | TROPHIC\_3 |
| Trophic | TROPHIC\_4.pa | Relative Abundance | TROPHIC\_4 |
| Trophic | TROPHIC\_4.pt | Relative Richness | TROPHIC\_4 |
| Trophic | TROPHIC\_4.r | Taxa Richness | TROPHIC\_4 |
| Trophic | TROPHIC\_5.pa | Relative Abundance | TROPHIC\_5 |
| Trophic | TROPHIC\_5.pt | Relative Richness | TROPHIC\_5 |
| Trophic | TROPHIC\_5.r | Taxa Richness | TROPHIC\_5 |
| Trophic | TROPHIC\_56.pt | Relative Richness | TROPHIC\_56 |
| Trophic | TROPHIC\_6.pa | Relative Abundance | TROPHIC\_6 |
| Trophic | TROPHIC\_6.pt | Relative Richness | TROPHIC\_6 |
| Trophic | TROPHIC\_6.r | Taxa Richness | TROPHIC\_6 |
| Trophic | TROPHIC\_7.pa | Relative Abundance | TROPHIC\_7 |
| Trophic | TROPHIC\_7.pt | Relative Richness | TROPHIC\_7 |
| Trophic | TROPHIC\_7.r | Taxa Richness | TROPHIC\_7 |
| Trophic | wa\_T\_WDEQ | Weighted Average | T\_WDEQ |
| Trophic | WA\_Trophic\_USGS | Weighted Average | Trophic\_USGS |

Table \_\_-2. Trait sources and citations.

|  |  |  |
| --- | --- | --- |
| **#** | **Source** | **Citation** |
| 1 | Bahls 1993 | Bahls, L.L., 1993, Periphyton bioassessment methods for Montana streams: Water Quality Bureau, Department of Health and Environmental Sciences, Helena, MT, 69 p. |
| 2 | Kelly and Whitton 1995 | Kelly, M. G., & Whitton, B. A. 1995. The trophic diatom index: a new index for monitoring eutrophication in rivers. *Journal of Applied Phycology*, *7*(4), 433-444. |
| 3 | Kelly et al. 2008 | Kelly, M., Juggins, S., Guthrie, R., Pritchard, S., Jamieson, J., Rippey, B., Hirst, H. and Yallop, M., 2008. Assessment of ecological status in UK rivers using diatoms. Freshwater biology, 53(2), pp.403-422. |
| 4 | Lange-Bertalot 1979 | Lange-Bertalot, H., 1979. Pollution tolerance of diatoms as a criterion for water quality estimation. Nova Hedwigia, Beih., 64, pp.285-304. |
| 5 | Porter et al.2008 | Porter, S.D., D.K. Mueller, N.E. Spahr, M.D. Munn. and N.M. Dubrovsky. 2008. Efficacy of algal metrics for assessing nutrient and organic enrichment in flowing waters. Freshwater Biology (2008) 53, 1036–1054; |
| 6 | Potapova and Charles 2007 | Potapova M. & Charles D.F. 2007. Diatom metrics for monitoring eutrophication in rivers of the United States. Ecological Indicators, 7, 48–70 |
| 7 | Potapova et al. 2004 | Potapova M., Charles D.F., Ponader K.C. & Winter D.M. 2004. Quantifying species indicator values for trophic diatom indices: comparison of approaches. Hydrobiologia, 517, 25 41 and Potapova M. & Charles D.F. 2007. Diatom metrics for monitoring eutrophication in rivers of the United States. Ecological Indicators, 7, 48–70; |
| 8 | Stevensonet al. 2008; | Stevenson, R. J., Y. Pan, K. M. Manoylov, C. A. Parker, D. P. Larsen, and A. T. Herlihy 2008. Development of diatom indicators of ecological conditions for streams of the western US. J. N. Am. Benthol. Soc., 2008, 27(4):1000–1016; |
| 9 | Stevenson, unpublished | Stevenson, R. J., Michigan State, unpublished; |
| 10 | Stevenson and Wang 2001 | Stevenson, R. J. and B. Wang. 2001. Developing and Testing Algal Indicators of Nutrient Status in Florida Streams. Final Report Prepared for Florida Department of Environmental Protection. October 31, 2001. |
| 11 | Tang et al. 2016 | Tang, T., R.J. Stevenson, and D.M. Infante. 2016. Accounting for regional variation in both natural environment and human disturbance to improve performance of multimetric indices of lotic benthic diatoms. Science of the Total Environment, 568:1124-1134 |
| 12 | Teply and Bahls 2005 | Teply, M., & Bahls, L. 2005. Diatom Biocriteria for Montana Streams. Prepared for the Montana Department of Environmental Quality by Larix Systems. Inc. of Helena, Montana. |
| 13 | van Dam et al. 1994 | van Dam, H., Mertens, A., Sinkeldam, J., 1994. A coded and ecological indicator values of freshwater diatoms from the Netherlands. Neth. J. Aquat. Ecol. 28, 117–133.; |
| 14 | WDEQ (van Dam et al. 1994) | WDEQ - after van Dam et al. 1994 |
| 15 | DONA (diatoms.org) | Diatoms of North America (diatoms.org) |
| 16 | Riato (unpublished) | Riato, L., U.S. EPA unpublished |
| 17 | WDEQ 2022 | Wyoming Department of Environmental Quality database |
| 18 | Carlisle et al. 2022 | Carlisle, D.M., S.A. Spaulding, M.A. Tyree, N.O. Schulte, S.S. Lee, R.M. Mitchell, and A.A. Pollard. 2022. A web-based tool for assessing the condition of benthic diatom assemblages in streams and rivers of the conterminous United States. Ecological Indicators, 135, p.108513. |

Table \_\_-3. Trait definitions. Refer to Table \_\_-2 for trait citations.

| **Trait** | **Trait Description** | **Citation** |
| --- | --- | --- |
| ACHNANTHIDIAE | The family Achnanthidiaceae was responsive at the national scale. | 11 |
| ACHNANTHIDIAE.res.WST | National MMI index metric residual for the West site class | 18 |
| ACHNANTHIDIUM | A series of taxonomic groups, general habitat preferences, and motility were included in a set of diatom metrics that were tested in sites across the US (Tang et al. 2016). This study reported that species within the genus Achnanthidium were among the most responsive at the national scale. Due to taxonomic re-classification, some taxa named Achnanthidium in the database are not used in the metric. | 11 |
| ADNATE | Diatoms with one valve face attached to a surface was a character responsive at the national scale. | 11 |
| ARAPHID | Diatom species lacking a raphe system | 15 |
| BACILLARIACEAE | The family Bacillariaceae was responsive at the national scale. | 11 |
| Bahls\_1 | General tolerance of diatoms to human impact was developed by Bahls (1993), working in Montana rivers. BAHLS\_1 is a category that is applied to taxa that are most tolerant to a wide range of pollutants. | 1 |
| Bahls\_12 | Combination of traits in this category |  |
| Bahls\_2 | BAHLS\_2 describes less tolerant taxa. | 1 |
| Bahls\_3 | BAHLS\_3 describes sensitive taxa. | 1 |
| Bahls\_USGS | Combination of traits in this category |  |
| BC\_1 | The Biological Condition rating (diatoms.org) takes many factors into account (alkalinity, salinity, organic nutrients, etc.) based on a number of reports (Lange-Bertalot 1979, Van Dam 1994, Bahls 1993, Porter 2008) merged with professional experience following the Biological Condition Gradient (BCG) approach (Davies and Jackson 2006). BC\_1 represents sensitive taxa associated with low anthropogenic stress and often includes rare and endemic taxa. | 15 |
| BC\_1.res.ELO | National MMI index metric residual for the Eastern Lowlands site class | 18 |
| BC\_12 | Combination of traits in this category |  |
| BC\_123 | Combination of traits in this category |  |
| BC\_2 | BC\_2 represents moderately sensitive taxa. | 15 |
| BC\_3 | BC\_3 represents ubiquitous taxa, indifferent to a wide range of environmental condition. | 15 |
| BC\_4 | BC\_4 represents taxa tolerant of moderate human impact. | 15 |
| BC\_4.res.WST | National MMI index metric residual for the West site class | 18 |
| BC\_45 | Combination of traits in this category |  |
| BC\_5 | BC\_5 represents highly tolerant taxa. | 15 |
| BC\_USGS | Combination of traits in this category |  |
| Ben\_Ses\_1 | Benthic algae (1), Sestonic algae (2) | 5 |
| Ben\_Ses\_2 | Benthic algae (1), Sestonic algae (2) | 5 |
| BENTHIC\_HABIT | Metrics related to traits for general habitat, nitrogen fixation, motility, and cell size are documented in the autecology section of Diatoms of North America (diatoms.org). Benthic species are primarily bottom dwellers, or species that are attached to surfaces. | 15 |
| BIG | Big cells are those that range from 10,001-100,000 µm3 (i.e. Caloneis amphisbaena, Cymbella tumida). | 15 |
| CENTRIC | Diatoms having valves with radial symmetry. They lack a raphe system and lack significant motility. | 15 |
| CENTRIC.ELO | National MMI index metric for the Eastern Lowlands site class | 18 |
| Cyclotella | Diatoms in the genus Cyclotella | 16 |
| Cymbella | Diatoms in the genus Cymbella | 16 |
| Diat\_Ca\_1 | Calcium tolerant diatoms 1, Calcium sensitive diatoms 2 | 5 |
| Diat\_Ca\_2 | Calcium tolerant diatoms 1, Calcium sensitive diatoms 2 | 5 |
| Diat\_Cl\_1 | Chloride tolerant diatoms 1, Chloride sensitive diatoms 2 | 5 |
| Diat\_Cl\_2 | Chloride tolerant diatoms 1, Chloride sensitive diatoms 2 | 5 |
| Diat\_Cond\_1 | Conductivity tolerant diatoms 1, conductivity sensitive diatoms, 2 | 5 |
| Diat\_Cond\_2 | Conductivity tolerant diatoms 1, conductivity sensitive diatoms, 2 | 5 |
| Diatas\_TN\_1 | Nitrogen tolerant diatoms 1, Nitrogen sensitive diatoms, 2 | 5 |
| Diatas\_TN\_2 | Nitrogen tolerant diatoms 1, Nitrogen sensitive diatoms, 2 | 5 |
| Diatas\_TP\_1 | Phosphorus tolerant diatoms 1, Phosphorus sensitive diatoms, 2 | 5 |
| Diatas\_TP\_2 | Phosphorus tolerant diatoms 1, Phosphorus sensitive diatoms, 2 | 5 |
| H\_WDEQ | Combination of traits in this category |  |
| H\_WDEQ\_1 | Tolerance to salinity is represented by the categories of fresh to brackish waters (Van Dam et al. 1994) as interpreted by WDEQ. . SALINITY\_1 taxa are associated with “fresh” water, with < 100 mg/L chloride, or < 0.2 ppt total salinity. | 17 |
| H\_WDEQ\_2 | SALINITY\_2 includes waters that are considered to be “fresh-brackish”, with < 500 mg/L chloride, or < 0.9 ppt total salinity. | 17 |
| H\_WDEQ\_3 | SALINITY\_3 includes waters that are considered to be “brackish-fresh”, with 500-1000 mg/L chloride, or 0.9-1.8 ppt total salinity. | 17 |
| H\_WDEQ\_34 | Combination of traits in this category |  |
| H\_WDEQ\_4 | SALINITY\_4 includes waters that are considered to be “brackish”, with 1000-5000 mg/L chloride, or 1.8-9.0 ppt total salinity. | 17 |
| HIGH\_N | HIGH\_N taxa are characteristic of total nitrogen concentrations > 3 mg/L. | 6 |
| HIGH\_N.r.res.WST | National MMI index metric residual for the West site class | 18 |
| HIGH\_P | HIGH\_P taxa are characteristic of total phosphorus concentrations > 100 ug/L. | 6 |
| HIGHLY\_MOTILE | Highly motile species possess a complete raphe system (biraphid) and cells are large in size, or the raphe is positioned in a raised keel so that cells are highly adapted to movement on surfaces (i.e., Surrirella, Stenopterobia). | 15 |
| HIGHLY\_MOTILE.1 | Highly motile species . | 15 |
| HIGHLY\_MOTILE.res.ELO | National MMI index metric residual for the Eastern Lowlands site class | 18 |
| LOW\_N | LOW\_N taxa are characteristic of total nitrogen concentrations < 0.2 mg/L. | 6 |
| LOW\_P | Nutrient status metrics are the only metrics that are based on data from US rivers (Potapova and Charles 2007). Diatom counts and chemistry data from 1240 rivers from the U.S. Geological Survey National Water-Quality Assessment (NAWQA) were used to develop relationships between species and concentration of nitrogen and phosphorus. These metrics differ from those developed previously from European waters and provide a better source for assessments in U.S. rivers. LOW\_P taxa had the greatest fidelity to waters with total phosphorus concentrations < 10 ug/L. | 6 |
| LOW\_P.res.ELO | National MMI index metric residual for the Eastern Lowlands site class | 18 |
| M\_WDEQ | Combination of traits in this category |  |
| M\_WDEQ\_1 | Moisture affinity as interpreted by WDEQ | 17 |
| M\_WDEQ\_12 | Combination of traits in this category |  |
| M\_WDEQ\_2 | Moisture affinity as interpreted by WDEQ | 17 |
| M\_WDEQ\_3 | Moisture affinity as interpreted by WDEQ | 17 |
| M\_WDEQ\_4 | Moisture affinity as interpreted by WDEQ | 17 |
| M\_WDEQ\_5 | Moisture affinity as interpreted by WDEQ | 17 |
| MEDIUM | Medium cells are those that range from 1001-10,000 µm3 (i.e. Diatoma vulgaris, Nitzschia hitchcockii). | 15 |
| MODERATELY\_MOTILE | Moderately motile species possess a complete raphe system (biraphid) and cells are moderate in size. | 15 |
| Motility\_USGS | Combination of traits in this category |  |
| N\_FIXER | Some species (within the general Epithemia and Rhophalodia) may contain symbiotic cyanobacteria within their cells. The endosymbionts are capable of nitrogen fixation, producing nitrogen for use by the diatom cell. | 15 |
| N\_WDEQ | Combination of traits in this category |  |
| N\_WDEQ\_1 | Nutrient tolerance as interpreted by WDEQ | 17 |
| N\_WDEQ\_12 | Combination of traits in this category |  |
| N\_WDEQ\_2 | Nutrient tolerance as interpreted by WDEQ | 17 |
| N\_WDEQ\_3 | Nutrient tolerance as interpreted by WDEQ | 17 |
| N\_WDEQ\_34 | Combination of traits in this category |  |
| N\_WDEQ\_4 | Nutrient tolerance as interpreted by WDEQ | 17 |
| Nat\_MMI | National MMI index | 18 |
| NAVICULA | The genus Navicula was responsive at the national scale. Due to taxonomic re-classification, some taxa named Navicula in the database are not used in the metric. | 11 |
| NFixers | Genera that are not capable of nitrogen fixation. | 16 |
| ni\_total | Total number of valves counted |  |
| NON\_MOTILE | Diatom species can be characterized by the ability of the cell to move over surfaces. Non-motile species lack a raphe system, and include centric (i.e., Cyclotella, Stephanodiscus) and araphid (i.e., Fragilaria, Staurosirella) genera. | 15 |
| NON\_N\_FIXER | Species that are not capable of nitrogen fixation. | 15 |
| O\_1 | Classification of “oxygen requirements” is based on several sources (Hustedt 1938, Cholnoky 1968, Van Dam 1975) and summarized in Van Dam et al. (1994). This title of this metric is somewhat misleading, as photosynthetic organisms, diatoms do not require oxygen. Yet, as with the saprobian system, dissolved oxygen concentrations are related to the organic material present. O\_1 represents nearly 100% O2 saturation (Van Dam et al. 1994). | 13 |
| O\_2 | O\_2 represents >75% O2 saturation. | 13 |
| O\_3 | O\_3 represents >50% O2 saturation. | 13 |
| O\_4 | O\_4 represents >30% O2 saturation. | 13 |
| O\_45 | Combination of traits in this category |  |
| O\_5 | O\_5 represents about 10% O2 saturation, or less. | 13 |
| O\_WDEQ | Combination of traits in this category |  |
| O\_WDEQ\_1 | Classification of “oxygen requirements” as summarized in Van Dam et al. (1994) and interpreted by WDEQ. O\_1 represents nearly 100% O2 saturation. | 17 |
| O\_WDEQ\_12 | Combination of traits in this category |  |
| O\_WDEQ\_2 | O\_2 represents >75% O2 saturation. | 17 |
| O\_WDEQ\_3 | O\_3 represents >50% O2 saturation. | 17 |
| O\_WDEQ\_34 | Combination of traits in this category |  |
| O\_WDEQ\_4 | O\_4 represents >30% O2 saturation. | 17 |
| OptCat\_DisTotMMI | Weighted average multivariate optima (raw score) | 8 |
| OptCat\_L1DisTot | Diatom optima values to watershed disturbance, ranging from 0-4 | 8 |
| OptCat\_L1Ptl | Diatom optima values to log(TP), ranged from 0-6 | 8 |
| OptCat\_LCond | Diatom optima values to conductivity, ranged between 3-8 | 8 |
| OptCat\_LNtl | Diatom optima values to log(TN), ranged between 3-8 | 8 |
| OptCat\_NutMMI | Weighted average nutrient mutivariate optima (raw score) | 8 |
| OptCat\_PctFN | Diatom optima values to percent fine ranged from 0-100 | 8 |
| OptCat\_pH | Diatom optima values to pH, ranged between 7.1-8.6 | 8 |
| OptCat\_XEMBED | Diatom optima values to embededness ranged from 0-100 | 8 |
| pH\_WDEQ | Combination of traits in this category |  |
| pH\_WDEQ\_1 | pH affinity as interpreted by WDEQ | 17 |
| pH\_WDEQ\_2 | pH affinity as interpreted by WDEQ | 17 |
| pH\_WDEQ\_3 | pH affinity as interpreted by WDEQ | 17 |
| pH\_WDEQ\_4 | pH affinity as interpreted by WDEQ | 17 |
| pH\_WDEQ\_5 | pH affinity as interpreted by WDEQ | 17 |
| pH\_WDEQ\_6 | pH affinity as interpreted by WDEQ | 17 |
| Pioneer | Genera that colonize unstable systems rapidly | 16 |
| PT\_1 | The pollution tolerance system of Lange-Bertalot (1979) was based on a four year study of the Rhine-Main river system in Germany. At the time, the river was the most polluted river in Central Europe. Water was not treated until 1975 and included effluent of the paper industry. This metric includes some overlap with the saprobian system. | 4 |
| PT\_12 | Combination of traits in this category |  |
| PT\_2 | PT\_2 represents taxa that are very tolerant of highly degraded conditions. | 4 |
| PT\_3 | PT\_3 represents taxa that are very tolerant of degraded conditions. | 4 |
| PT\_4 | PT\_4 represents taxa that are tolerant of somewhat degraded conditions. | 4 |
| PT\_5 | PT\_5 represents taxa that are found in with low organic enrichment. | 4 |
| PT\_USGS | Combination of traits in this category |  |
| PTI\_WDEQ | The Pollution Tolerance Index as interpreted by WDEQ. | 17 |
| S\_WDEQ | Combination of traits in this category |  |
| S\_WDEQ\_1 | The saprobien system (SAP) as interpreted by WDEQ. SAP\_1 represents oxygen saturation of 85% and BOD < 2 mg/L. | 17 |
| S\_WDEQ\_2 | SAP\_2 represents oxygen saturation of 70-80% and BOD of 2-4 mg/L. | 17 |
| S\_WDEQ\_3 | SAP\_3 represents oxygen saturation of 25-75% and BOD of 4-13 mg/L. | 17 |
| S\_WDEQ\_345 | Combination of traits in this category |  |
| S\_WDEQ\_4 | SAP\_4 represents oxygen saturation of 10-25% and BOD of 13-22 mg/L. | 17 |
| S\_WDEQ\_5 | SAP\_5 represents oxygen saturation of <10% and BOD of >22 mg/L. | 17 |
| SALINITY\_1 | Tolerance to salinity is represented by the categories of fresh to brackish waters (Van Dam et al. 1994). SALINITY\_1 includes waters that are considered to be “fresh”, with < 100 mg/L chloride, or < 0.2 ppt total salinity. | 13 |
| SALINITY\_2 | SALINITY\_2 includes waters that are considered to be “fresh-brackish”, with < 500 mg/L chloride, or < 0.9 ppt total salinity. | 13 |
| SALINITY\_3 | SALINITY\_3 includes waters that are considered to be “brackish-fresh”, with 500-1000 mg/L chloride, or 0.9-1.8 ppt total salinity. | 13 |
| SALINITY\_3.WST | National MMI index metric for the West site class | 18 |
| SALINITY\_3.res.ELO | National MMI index metric residual for the Eastern Lowlands site class | 18 |
| SALINITY\_4 | SALINITY\_4 includes waters that are considered to be “brackish”, with 1000-5000 mg/L chloride, or 1.8-9.0 ppt total salinity. | 13 |
| Salinity\_USGS | Combination of traits in this category |  |
| SAP\_1 | The saprobien system (SAP) was developed for rivers based on microorganisms that are present in response to contamination by sewage, and the biological demand for oxygen (BOD). The system was developed in Germany and has been widely applied in Europe. SAP\_1 represents oxygen saturation of 85% and BOD < 2 mg/L. | 13 |
| SAP\_2 | SAP\_2 represents oxygen saturation of 70-80% and BOD of 2-4 mg/L. | 13 |
| SAP\_3 | SAP\_3 represents oxygen saturation of 25-75% and BOD of 4-13 mg/L. | 13 |
| SAP\_4 | SAP\_4 represents oxygen saturation of 10-25% and BOD of 13-22 mg/L. | 13 |
| SAP\_45 | Combination of traits in this category |  |
| SAP\_5 | SAP\_5 represents oxygen saturation of <10% and BOD of >22 mg/L. | 13 |
| SAP\_USGS | Combination of traits in this category |  |
| SESTONIC\_HABIT | Sestonic species are primarily suspended in the plankton and include species that are found in lentic habitats of lakes, reservoirs, or slow moving rivers. | 15 |
| Size\_USGS | Combination of traits in this category |  |
| SLIGHTLY\_MOTILE | Slightly motile species possess a complete raphe system (biraphid) but cells are very small, or cells are affixed to surfaces by a mucilage pad (i.e., Achnanthidium, Cocconeis). | 15 |
| SMALL | Small cells are those that range from 101-1000 µm3 in cell volume (i.e. Amphora veneta, Caloneis bacillum). | 15 |
| STALKED | Diatoms that produce stalks was a character responsive at the national scale. | 11 |
| T\_WDEQ | Combination of traits in this category |  |
| T\_WDEQ\_1 | The trophic categories of Van Dam et al. (1994) as interpreted by WDEQ. T\_1 oligotraphentic taxa are characteristic of environments with a low supply of nutrients, particularly nitrogen and phosphorus. | 17 |
| T\_WDEQ\_12 | Combination of traits in this category |  |
| T\_WDEQ\_123 | Combination of traits in this category |  |
| T\_WDEQ\_2 | Oligotraphentic-mesotraphentic taxa characteristic of environments with a slightly higher supply of nutrients than in oligotraphentic habitats, but not as much as in mesotraphentic habitats. | 17 |
| T\_WDEQ\_3 | Mesotraphentic taxa are characteristic of environments with an intermediate supply of nutrients. | 17 |
| T\_WDEQ\_4 | Mesotraphentic-eutraphentic taxa are characteristic of environments with a higher supply of nutrients than in mesotraphentic habitats, but not as much as in eutraphentic habitats. | 17 |
| T\_WDEQ\_5 | Eutraphentic taxa are characteristic of environments with a rich supply of nutrients. | 17 |
| T\_WDEQ\_56 | Combination of traits in this category |  |
| T\_WDEQ\_6 | Hypereutraphentic taxa are characteristic of environments with an extreme supply of nutrients. | 17 |
| T\_WDEQ\_7 | Eurytraphentic taxa are characteristic of environments with a wide range of nutrient concentrations; taxa that are indifferent to nutrients. | 17 |
| taxacount | Total Taxa identifified | 17 |
| TROPHIC\_1 | The trophic categories of Van Dam et al. (1994) are based on relative measures; absolute concentrations are not specified. Oligotraphentic taxa are characteristic of environments with a low supply of nutrients, particularly nitrogen and phosphorus. | 13 |
| TROPHIC\_123 | Combination of traits in this category |  |
| TROPHIC\_2 | Oligotraphentic-mesotraphentic taxa characteristic of environments with a slightly higher supply of nutrients than in oligotraphentic habitats, but not as much as in mesotraphentic habitats. | 13 |
| TROPHIC\_3 | Mesotraphentic taxa are characteristic of environments with an intermediate supply of nutrients. | 13 |
| TROPHIC\_4 | Mesotraphentic-eutraphentic taxa are characteristic of environments with a higher supply of nutrients than in mesotraphentic habitats, but not as much as in eutraphentic habitats. | 13 |
| TROPHIC\_5 | Eutraphentic taxa are characteristic of environments with a rich supply of nutrients. | 13 |
| TROPHIC\_56 | Combination of traits in this category |  |
| TROPHIC\_6 | Hypereutraphentic taxa are characteristic of environments with an extreme supply of nutrients. | 13 |
| TROPHIC\_7 | Eurytraphentic taxa are characteristic of environments with a wide range of nutrient concentrations; taxa that are indifferent to nutrients. | 13 |
| Trophic\_USGS | Combination of traits in this category |  |
| TubeDwellers | Tude dwelling genera | 16 |
| VERY\_BIG | Very big cells are those that range from 100,001-1,000,000 µm3 (i.e. Didymosphenia geminata, Pleurosira laevis). | 15 |
| VERY\_SMALL | In terms of cell volume, diatoms range in size over five orders of magnitude. Cell volume has implications for nutrient update, cell physiology, and rates of cell division. In this schema, very small cells are those that range from 11-100 μm3 in cell volume (i.e. Achnanthidium atomus, Kraskella). | 15 |
| WEAKLY\_MOTILE | Weakly motile species possess a raphe system that is highly reduced (i.e., Eunotia), or secondarily filled with silica (i.e., Humidophila). | 15 |
| WEAKLY\_MOTILE.WST | National MMI index metric for the West site class | 18 |