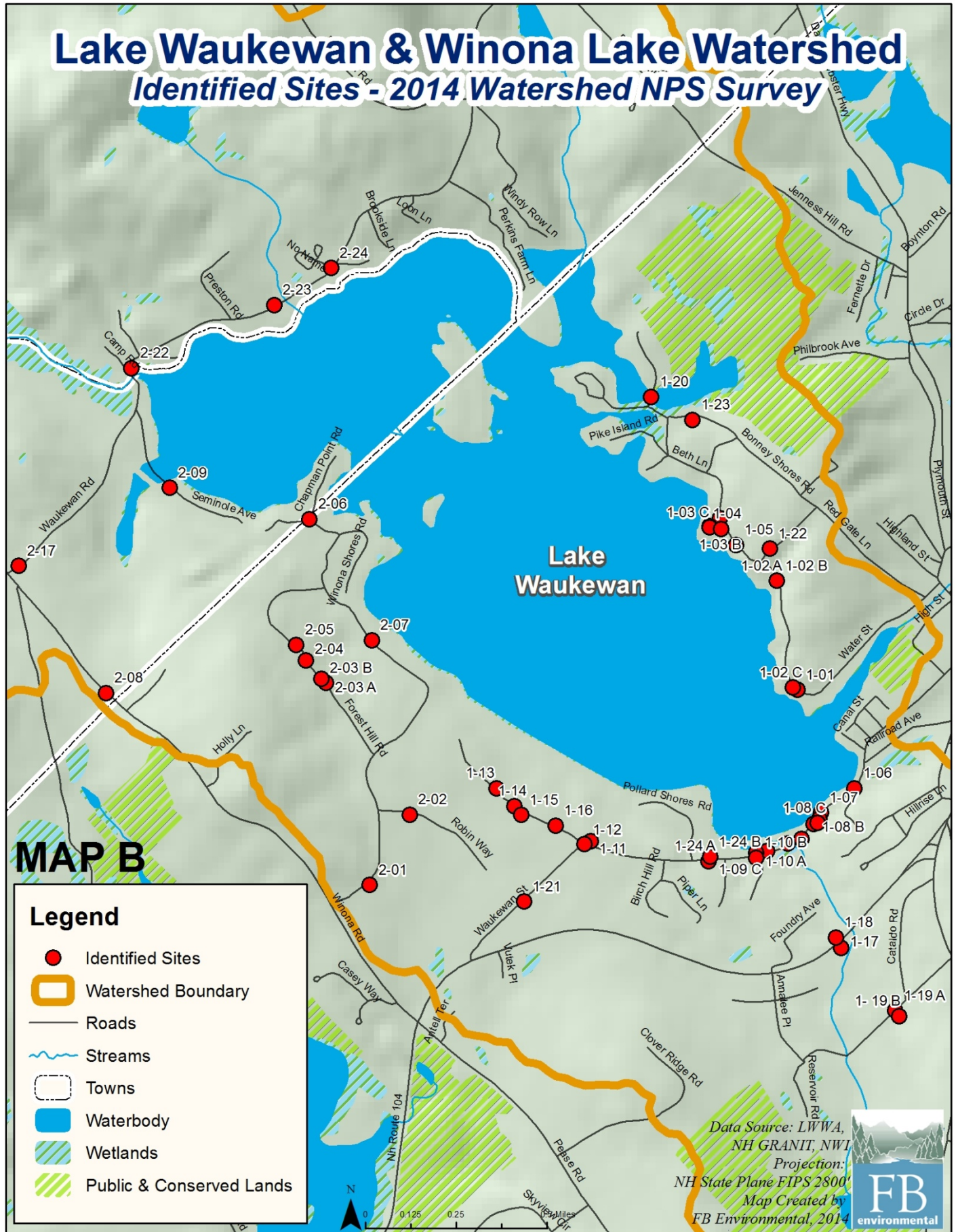


Lake Waukewan & Winona Lake Watershed Identified Sites - 2014 Watershed NPS Survey



E.1.

Waukegan Prioritized Sites

| Site | Location | Land Use | Issues | Recommendations | Impact rating | Sediment (t/yr) | Phosphorus (lbs/yr) | Phosphorus (kg/yr) | BMP Cost Estimate | BMP Annual Maintenance Cost Estimate | 10-yr Cost | 10-yr Cost for TP Removed (\$/kg) | Cost | Technical Level |
|--------|--|-------------------------------------|---|---|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 1-09 C | Waukegan St. (W of site 1-09 B) | Town Road | Bare soil- adjacent parking lot, winter sand | Remove winter sand early spring, reseed bare soil and thinning grass on adjacent property | Low | 15.8 | 13.4 | 6.1 | \$575 | \$75 | \$1,325 | \$218 | Low | Low |
| 2-07 | 100 Winona Shores Road | Town Road | Slight to moderate ditch erosion (will get worse with big storms), slight road shoulder erosion, lots of winter sand | Vegetate ditch or armor with stone, vegetate shoulder | Low | 13.8 | 13.8 | 6.3 | \$1,150 | \$50 | \$1,650 | \$264 | Medium | Low |
| 1-21 | Waukegan ditches from Rt. 104 to bottom of hill at Wall Street | Town Road | Moderate to severe ditch erosion, moderate road shoulder erosion, winter sand | Vegetate ditch, reshape ditch, install sediment pools, vegetation mats or riprap | High | 12.6 | 10.7 | 4.9 | \$2,000 | \$250 | \$4,500 | \$927 | Medium | Medium |
| 2-08 | Picket Fence & Winona (across from cemetery) | State and Private Road Intersection | Severe ditch erosion at one point along road, ditch turnout is plugged- will take out road at some point, moderate surface erosion, bare soil | Change ditch cross-section & remove plug and/or stabilize new ditch, install detention pond? | Medium | 17.9 | 17.9 | 8.1 | \$3,625 | \$250 | \$6,125 | \$754 | High | High |
| 1-08 A | Waukegan Swimming Bath House Parking Lot | Municipal/ Public | Moderate surface erosion, slight road shoulder erosion, bare soil in parking area, winter sand-snow dump area with lots of snow and winter sand adjacent to catchbasin that outlets directly to lake. | Add new surface material to parking area (crushed stone?) to prevent movement of sand, vegetate shoulder, Re-seed grassed areas, armor catchbasin outlet at beach and create plunge pool. | Medium | 10.5 | 8.9 | 4.0 | \$1,260 | \$300 | \$4,260 | \$1,055 | Medium | Medium |
| 2-03 B | Rd ditch near 28 Forest Hill Rd | Town Rd | Moderate surface erosion, moderate ditch erosion, moderate road shoulder erosion, bare soil, winter sand | Armor ditch with stone, install check dams, vegetate shoulder | Medium | 8.9 | 8.9 | 4.0 | \$2,400 | \$500 | \$7,400 | \$1,833 | High | High |
| 2-05 | Other side of 36 Forest Hill | Town Road | Moderate surface erosion, moderate ditch erosion, moderate road shoulder erosion, bare soil, winter sand | Armor ditch with stone, install check dams, add another cross culvert and divert to level spreader | Medium | 8 | 8 | 3.6 | \$4,100 | \$300 | \$7,100 | \$1,957 | High | High |
| 2-02 | Robin Way | Town Unpaved road | Moderate surface erosion, moderate ditch erosion, moderate road shoulder erosion, bare soil | Armor ditch with stone, vegetate shoulder, remove railroad ties and direct to a vegetated swale | Medium | 5.2 | 5.2 | 2.4 | \$3,600 | \$150 | \$5,100 | \$2,162 | Medium | Medium |
| 1-06 | Waukegan St. | Town Road | Slight surface erosion, slight road shoulder erosion, bare soil, shoreline erosion from ice action, road sediment into catch basin and ditch along railroad tracks that outfalls directly to the lake | Vegetate shoulder, remove winter sand, redirect water from culvert away from lake and install a detention basin. | Low | 6.3 | 5.4 | 2.4 | \$3,000 | \$250 | \$5,500 | \$2,245 | High | High |

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Waukegan Prioritized Sites

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|--------|--|---------------------------|--|--|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 1-04 | 84 Red Gate Lane | Town Unpaved Road | Severe surface erosion, severe ditch erosion, severe road shoulder erosion, bare soil, lots of winter sand | Armor inlet/outlet, install ditch and armor with stone, install turnouts, vegetate shoulder, Pave road? | High | 1.6 | 1.6 | 0.7 | \$3,150 | \$250 | \$5,650 | \$7,785 | High | High |
| 2-06 | Indian Trail Rd & Chapman Point | Town/Private Unpaved Road | General gravel road maintenance, poor crown, bare soil, moderate surface erosion, winter sand, wrong aggregate mix? | Build-up road/add new surface material, reshape crown, vegetate shoulder | Medium | 18 | 18 | 8.2 | \$8,300 | \$2,500 | \$33,300 | \$4,079 | High | High |
| 2-24 | Mayo Farms Cottages + Campground | Commercial | Slight road shoulder erosion, winter sand, undercut streambank with erosion and lack of vegetation, fields mowed to streambank | Vegetate shoulder, establish buffer | High | 1.2 | 1.2 | 0.5 | \$5,000 | \$100 | \$6,000 | \$11,023 | High | Medium |
| 1-02 A | Next to 110 Water St-culvert/crossing upstream | Town Road | Moderate surface erosion, moderate road shoulder erosion, bare soil, streambank erosion, winter sand. Stormwater from Rd has created gullies toward crossing/stream, small stream flows to Waukegan- lots of inputs from winter sand and road shoulder | Vegetate shoulder, reshape ditch and armor with stone, install turnouts away from stream into woods, reseed bare soil & thinning grass | High | 0.7 | 0.7 | 0.3 | \$2,075 | \$250 | \$4,575 | \$14,409 | Medium | High |
| 1-02 B | Next to 110 Water St. (downstream side) | Town Road | Moderate surface erosion, moderate road shoulder erosion, lots of winter sand, streambank erosion | Vegetate ditch, reshape ditch and armor with stone, install turnouts away from stream, reseed bare soil & thinning grass | High | 0.7 | 0.6 | 0.3 | \$1,475 | \$250 | \$3,975 | \$14,606 | Medium | High |
| 1-22 | Red Gate Road | Town Unpaved Road | Moderate surface erosion, undersized ditches on either side of road, moderate road shoulder erosion, winter sand, gravel road that slopes towards the lake | install turnouts, install ditch, buildup road with new surface material. | High | 2.5 | 2.5 | 1.1 | \$13,720 | \$500 | \$18,720 | \$16,508 | High | High |
| 1-17 | Rt. 104 stream crossing, Reservoir Brook, upstream | State Road | slight surface erosion, unstable inlet/outlet (top erosion headwall), moderate ditch erosion | armor inlet/outlet, vegetate ditch, armor ditch with stone, reshape ditch | Low | 0.4 | 0.4 | 0.2 | \$1,300 | \$100 | \$1,000 | \$5,512 | Medium | Medium |
| 1-07 | Waukegan St. next to beach area (south end) | Town Road | Moderate surface erosion, shoreline erosion | Install runoff diverter (waterbar), or create infiltration and sediment capture with stone, add to buffer, reseed bare soil and thinning grass | Medium | 0.6 | 0.5 | 0.2 | \$1,100 | \$100 | \$2,100 | \$9,259 | Medium | Low |

E.1.

Waukewan Prioritized Sites

| Site | Location | Land Use | Issues | Recommendations | Impact rating | Sediment (t/yr) | Phosphorus (lbs/yr) | Phosphorus (kg/yr) | BMP Cost Estimate | BMP Annual Maintenance Cost Estimate | 10-yr Cost | 10-yr Cost for TP Removed (\$/kg) | Cost | Technical Level |
|--------|---|-------------|---|--|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 1-09 A | Stream Crossing West of Beach area, Waukewan St. | Town Road | Unstable inlet, severe ditch erosion, moderate to severe road shoulder erosion, bare soil, winter sand, severe undercut streambank with lack of vegetation and erosion | Armor inlet of large road crossing, stabilize road shoulder/ditch to prevent undercutting, vegetate shoulder on upstream side, and add to buffer on downstream side of crossing. | Medium | 1.2 | 1.2 | 0.5 | \$3,280 | \$200 | \$5,280 | \$9,700 | High | Medium |
| 1-19 A | Reservoir St between 20 and 22 | Town Road | Moderate to severe surface erosion, unstable outlet, clogged culvert, slight to moderate road shoulder erosion, bare soil, winter sand | Armor outlet, vegetate ditch, reshape ditch, vegetate shoulder, work with owner to clean/vegetate bank | High | 0.4 | 0.4 | 0.2 | \$2,550 | \$100 | \$3,550 | \$19,566 | Medium | Medium |
| 1-24 A | Waukewan Street next to 107 (stream crossing) | Town Road | Moderate surface erosion, unstable inlet/outlet, moderate road shoulder erosion | Armor inlet/outlet, vegetate shoulder around streambank | Medium | 0.3 | 0.3 | 0.1 | \$1,000 | \$50 | \$1,500 | \$11,023 | Medium | Medium |
| 1-13 | Wall Street culvert | Town Road | Moderate surface erosion, moderate road shoulder erosion, gravel road deposits lots of sediment into stream at crossing, stormwater from Waukewan Street flows to this spot and into ditch/drainage | Vegetate shoulder, water retention swales, create fore bays to trap sediment from eroding road shoulder and ditch, | High | 1.2 | 1.2 | 0.5 | \$2,900 | \$500 | \$12,900 | \$23,700 | High | High |
| 1-18 | Rt. 104 Reservoir Brook crossing | State Road | Unstable outlet, broken culvert, undersized culvert, delta in stream | Armor outlet, enlarge culvert | High | 0.6 | 0.4 | 0.2 | \$4,500 | \$0 | \$4,500 | \$24,802 | High | High |
| 2-01 | 9 Winona Shores (on rd) | Town Road | Slight surface erosion, slight road shoulder erosion, bare soil, road drainage intermittent, culvert under road, erosion of both shoulders | Vegetate shoulder (downstream and upstream) | Low | 0.4 | 0.4 | 0.2 | \$1,000 | \$50 | \$1,500 | \$8,267 | Medium | Low |
| 1-08 C | RR tracks behind beach bath house on Waukewan St. | RR ROW | Slight to moderate ditch erosion, unknown pipes draining to ditch eroding slope above, lots of water in ditches. | Armor inlet/outlet (place stone at pipe outlets), armor ditch with stone, investigate pipes from adjacent residence. | Low | 0.4 | 0.4 | 0.2 | \$850 | \$100 | \$1,850 | \$10,196 | Medium | Low |
| 1-02 C | Next to 108 + 110 Water St. | Residential | Undercut shoreline, lack of shoreline vegetation, inadequate shoreline vegetation, shoreline erosion | Mulch/erosion control mix, establish buffer, add to buffer | Medium | 0.5 | 0.4 | 0.2 | \$2,390 | \$50 | \$2,890 | \$15,928 | Medium | Low |

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|---------|--|--------------|--|--|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 1- 19 B | Reservoir Rd Stream Crossing | Residential | Slight to moderate surface erosion, bare soil, undercut shore line with lack of/inadequate shoreline vegetation | Mulch/erosion control mix, water retention swales (lots of parked vehicles and equipment on property), establish buffer, add to buffer, reseed bare soil and thinning soil | Medium | 0.7 | 0.7 | 0.3 | \$4,800 | \$50 | \$5,300 | \$16,692 | High | Medium |
| 1-23 | Bonney Shore Road | Private Road | Moderate surface erosion, moderate ditch erosion, slight road shoulder erosion, winter sand | Vegetate and/or armor ditches, line turnouts/ sediment capturing basins so they can be cleaned out | Medium | 1.8 | 1.8 | 0.8 | \$4,000 | \$1,000 | \$14,000 | \$17,147 | High | Medium |
| 1-03 A | Next to 87/88 Red Gate Lane (culvert) | Town Road | Sever surface erosion, unstable inlet, crushed/broken inlet, severe ditch erosion, severe road shoulder erosion, winter sand, gravel Rd - poor surface material and no crown | Replace culvert, reshape ditch and armor ditch with stone, install turnouts and check dams, Build up/add new surface material (gravel) to road or pave, reshape to crown. | High | 0.8 | 0.6 | 0.3 | \$7,330 | \$250 | \$9,830 | \$36,119 | High | High |
| 1-15 | 23 Wall Street on Road | Town Road | Moderate surface erosion, unstable inlet/outlet, culvert slightly crushed, moderate road shoulder erosion, sediment from road into stream ditch | armor inlet/outlet, replace/enlarge/lengthen culvert, vegetate ditch or armor with stone, vegetate shoulder | High | 0.5 | 0.5 | 0.2 | \$5,720 | \$250 | \$8,220 | \$36,244 | High | High |
| 2-17 | Saywood Brook @ Waukegan Road (Winona Rd intersection) | State Road | Slight road shoulder erosion, undercut streambank (slightly), inadequate shoreline vegetation | Vegetate shoulder, investigate origin of pipe that outlet from property to the stream, vegetate shoulder/stabilize near culverts | Low | 0.4 | 0.4 | 0.2 | \$1,920 | \$50 | \$2,420 | \$13,338 | Medium | Low |
| 1-01 | Across from 72 Water St. | Town Road | Moderate surface erosion, moderate road shoulder erosion, bare soil. Lots of bare soil drains to catch basin and outfalls directly at lake across the st. | Vegetate Shoulder, install detention basin and direct flow away from lake, stabilize cleared lot and road shoulder | Medium | 0.9 | 0.8 | 0.4 | \$5,000 | \$250 | \$7,500 | \$20,668 | High | High |
| 1-03 B | 88 Red Gate Lane | Driveway | Slight surface erosion, bare soil | Armor inlet/outlet, install runoff diverters- direct runoff away from stream and into the woods | Low | 0.2 | 0.2 | 0.1 | \$1,160 | \$25 | \$1,410 | \$15,543 | Medium | Low |
| 1-03 C | 84 Red Gate Lane | Driveway | Slight surface erosion, bare soil | Armor inlet/outlet, install runoff diverters | Low | 0.2 | 0.2 | 0.1 | \$1,160 | \$25 | \$1,410 | \$15,543 | Medium | Low |

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Waukewan Prioritized Sites

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|--------|---|------------------|--|---|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 1-16 | Wall Street culvert | Town Road | moderate surface erosion, moderate to severe ditch erosion, moderate road shoulder erosion, road sediment into stream-heavy inputs | Armor inlet/outlet, enlarge culvert, armor ditch and create turnouts vegetate shoulder. | High | 0.2 | 0.2 | 0.1 | \$2,750 | \$250 | \$5,250 | \$57,871 | High | Medium |
| 1-05 | 74 Red Gate Lane | Town Road | Moderate surface erosion, unstable outlet, partially buried/clogged culvert, moderate ditch erosion, moderate road shoulder erosion, bare soil | Armor inlet and outlet, remove clog and clean out culvert, install ditch and armor with stone, install turnouts away from crossing, vegetate road shoulder, install plunge pool to slow flow down slope | High | 0.3 | 0.3 | 0.1 | \$5,470 | \$250 | \$7,970 | \$58,570 | High | High |
| 1-08 B | Catchbasin at corner of RR tracks and Waukewan St. | Town Road | Slight surface erosion, slight to moderate ditch erosion, lots of winter sand, slight road shoulder erosion | Armor ditch with stone and vegetate shoulder to prevent movement of sediment to catchbasin that outlets at beach. Remove winter sand. | Low | 0.2 | 0.2 | 0.1 | \$875 | \$125 | \$2,125 | \$23,424 | Medium | Medium |
| 1-12 | Catch basin outlet to Waukewan at bend in Waukewan St.(at Wall St corner) | Town Road | Slight surface erosion, slight road shoulder erosion, lots of sediment into drainage ditch | install armored ditch, vegetate shoulder | Low | 0.1 | 0.1 | 0.0 | \$675 | \$50 | \$1,175 | \$25,904 | Low | Low |
| 1-14 | Wall Street culvert # 2 | Town Road | Moderate surface erosion, moderate road shoulder erosion, road sediment into stream from gravel road | Vegetate ditch, vegetate shoulder, install detention basin and water retention swales to capture sediment | Medium | 0.4 | 0.4 | 0.2 | \$2,900 | \$500 | \$7,900 | \$43,541 | High | High |
| 2-03 A | 28 Forest Hill Road (driveway) | Driveway (paved) | Moderate surface erosion, bare soil, winter sand build-up in riprap ditch along driveway | Install turnouts, clean out sediment from riprap ditch (and other debris), vegetate shoulder, reseed bare soil and thinning grass | Medium | 0.1 | 0.1 | 0.0 | \$1,500 | \$50 | \$2,000 | \$44,092 | Medium | Low |
| 1-11 | At bend of Waukewan St. near Wall St. (un-named stream crossing) | Town Road | Moderate surface erosion, slight road shoulder erosion, undercut streambank (upstream), lots of road sediment from sanding, pipe (green pvc) outlet in down-stream side from yard across st. | Install ditch near crossing headwalls and armor with stone, install turnout, vegetate/stabilize shoulder | Medium | 0.2 | 0.2 | 0.1 | \$1,675 | \$250 | \$4,175 | \$46,022 | Medium | Medium |
| 1-20 | Right branch of Sawmill Shores | Town Road | Slight road shoulder erosion | Vegetate shoulder | Low | 0.1 | 0.1 | 0.0 | \$1,200 | \$50 | \$1,700 | \$37,479 | Medium | Low |

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|--------|---|---------------------|--|---|---------------|-----------------|---------------------|--------------------|-------------------|--------------------------------------|------------|-----------------------------------|--------|-----------------|
| 2-09 | Saywood Brook on Seminole Road (culvert under RR tracks where it goes under the road) | RR ROW? | Undersized culvert on the downstream side, probably more water than used to be there and eroding downstream bank, large amount of eroded debris | Either replace culvert or armor bank | Medium | 0.2 | 0.2 | 0.1 | \$6,000 | \$0 | \$6,000 | \$66,139 | High | Medium |
| 1-24 B | Stream Crossing near 107 Waukewan St (buffer) | Residential | Undercut shoreline with lack of/inadequate vegetation | Establish buffer, add to buffer | Low | 0.1 | 0.1 | 0.0 | \$1,920 | \$50 | \$2,420 | \$53,352 | Low | Low |
| 1-09 B | Culvert West of Site 1-09 A near driveway of #82 Waukewan St. | Town Road, Driveway | Slight surface erosion, unstable inlet, slight to moderate ditch erosion, slight road shoulder erosion, bare soil, winter sand | Armor inlet, vegetate shoulder, establish buffer | Low | 0.1 | 0.1 | 0.0 | \$1,680 | \$250 | \$4,180 | \$92,153 | Medium | Low |
| 2-22 | Snake River crossing inlet to Waukewan | State Road | Winter sand, moderate road shoulder erosion, lack of shoreline vegetation, stormwater created gully has eroded slope towards water carrying trash etc. | Create curbing to direct flow away from lake and to a detention area, stabilize shoreline/road shoulder, establish buffer | High | 0 | 0 | 0.0 | \$2,130 | \$100 | \$3,130 | n/a | Medium | High |
| 2-04 | 36 Forest Hill | Town road | unstable inlet/outlet, hanging culvert into plunge pool with eroded bank, bare soil | armor inlet and outlet, Install plunge pool at outlet, vegetate shoulder | Low | 0 | 0 | 0.0 | \$1,875 | \$100 | \$2,875 | n/a | Medium | Medium |
| 2-23 | Waukewan Rd, driveway adjacent w/ cut wood | State Road | Slight ditch erosion, winter sand, slight road shoulder erosion, unknown source of water drains directly to lake | Vegetate shoulder, establish buffer | Low | 0 | 0 | 0.0 | \$480 | \$50 | \$980 | n/a | Low | Low |
| 1-10 A | Waukewan St. next to Carder Lane (see photo for utility pole) | Town Road | Unstable inlet/outlet, slight road shoulder erosion, bare soil, winter sand | Armor inlet/outlet, vegetate shoulder, reseed bare soil and thinning grass | Low | 0.1 | 0 | 0.0 | \$700 | \$75 | \$1,450 | n/a | Medium | Low |
| 1-10 B | House next to Carder Ln on Waukewan St. | Residential | Lack of streambank vegetation, inadequate vegetation, mowed close to streambanks | Establish buffer, add to buffer | Low | 0 | 0 | 0.0 | \$960 | \$25 | \$1,210 | n/a | Medium | Low |