

Cost Analysis and Explanations for The Upper Tuscarawas Watershed Action Plan

Organizations*	Description of Cost(s)**
<p>A. Actions Involving Research - Many agencies approach funding by requesting blocks of money and appropriating it as needed. This is especially true of funding for activities involving research and education. It is extremely difficult, nearly impossible, for organizations to anticipate all situations or circumstances that will require money. Some specific agency costs associated with research activities follow, and costs generally revolve around labor costs, equipment, and materials/report production.</p>	
<p>A1. Constructed wetlands - Costs will vary, depending upon many environmental variables. <i>(Refer to actions 1.1c, 1.2c)</i></p>	
County SWCD, NEFCO, local health departments	<p><i>Summit SWCD:</i> \$70,000 for two separate sites totalling 2.5 acres (open pond and a celled-diversion project)</p> <ul style="list-style-type: none"> • \$25,000 for construction • \$7,000 for engineering • \$3,000 for plants <p><i>NEFCO:</i> \$42,000 for a two-celled wetland designed to treat waste from one home (612 sq. ft. in size). This cost includes design, construction, materials, plants, maintenance, photo documentation, public outreach and a written report with results (monitoring costs were not included). This project took place over a three year period.</p>
<p>A2. Alternative de-icing materials <i>(see D14.a, Refer to action 6.1c)</i></p>	
<p>A3. Identifying Well Locations <i>(Refer to actions 2.5a and 2.6a)</i></p>	
Ohio EPA	<p><i>Ohio EPA:</i> Public well mapping project costs based on two employees working 8 hours a day to complete GPS location of 750 wells. Employee salary \$25/hr.</p>
Davey Resource Group	<p><i>Davey Resource Group #:</i> Range of estimated costs, actual costs will depend on size of the area and time spent collecting the data.</p> <ul style="list-style-type: none"> • \$500 - \$15,000 for general resource assessment/field inventorying • up to \$50,000 for analytical field work - verifying point locations and specific details • \$7,000 - \$25,000 for a full-time GPS well location project with addressing available (assuming it would take two weeks - two months)
<p>A4. Monitoring Wells For Hydrocarbon Contamination <i>(Refer to action 2.5a)</i></p>	
ODNR/Div. of Oil and Gas Health Departments	<p><i>Stark County Health Department:</i> They use Aquatec Labs and Mahoning County. For eighty-paramater VOC testing, it costs \$80 per sample. For BTEX sampling, (Benzene, Toluene, Ethylbenzene, Xylene), it costs \$150 per sample.</p>

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<p>A5. Map production: Map production is an activity whose costs will vary greatly, depending mainly on the amount and type of data required to produce the map. If the data has already been collected and plotted on a map of some sort, new maps can be made quickly. The map will take longer if data is already available (names and addresses), but needs to be plotted. If data needs to be collected and the project could take years and therefore be very expensive. Costs will vary depending on time required and the specific agency producing the map. <i>(Refer to actions 1.3a, 2.3e, 2.4b, 2.5a2, 2.6a, 2.6d, 5.1a, 7.3a, b, c, e, f, and g.)</i></p>	
NEFCO	<p>NEFCO: \$140 - \$490/map and up (4-14 hours labor at \$35/hr)</p>
<p>A6. Pollution Source Information <i>(Refer to action 2.2a)</i></p>	
Ohio EPA, State and Local Health Departments, Private Sector, NEFCO	<p><i>Ohio EPA, Division of Hazardous Waste:</i> It would require at most one day of labor to sort through RCRA files to establish which hazardous waste producing industrial sources lie within the boundaries of the watershed. The time for this would be reduced if one knows, from previous study, which zip codes, streets, etc. lie within the watershed, because the files are listed alphabetically by name, but can be sorted by other categories. At \$25/hour, one day's labor would cost \$200.</p>
<p>B. Actions involving Education - There are many different kinds of educational materials and activities that can be performed to raise watershed awareness. The amount of money spent on education is up to the agency performing the action or plan - however much is available can be spent, and there are an infinite number of actions that can be taken. Some examples of materials and production costs for various types of educational activities are below. <i>(Refer to actions 1.1d, e; 1.2d, e; 1.5a, b; 2.1a2,e, 2.2b, c, 2.3b1,b2,b6, 2.3c1, 2.4c, 2.6c, 3.1d, 3.2a, 4.1d2, 5.1b1,b2; 5.1d, 5.2a,b, 5.3a, 6.2a, 7.1b, d)</i></p>	
Summit SWCD	<p>Newsletter - \$0.42/letter for 400 double-sided copies with two colors. This price includes the professional printing cost and one week worth of part-time labor to produce the publication.</p> <p>Survey - \$2/survey for a 2 page, double-sided survey, cover letter, a raffle incentive for recipient return, and postage to send and return the survey.</p> <p>Workshops - \$15/person, which includes rental space for a one day workshop. (Food cost is passed on to attendees.)</p>
Ohio EPA	<p>Educational demo. - \$1,200 - \$1,500 to show the Enviroscope Model, which illustrates how pollutants move within a watershed.</p> <p>Note: Costs of meetings or demonstrations depend on how long the presentation will be, amount of preparation involved, and transportation costs. These would be calculated using employee salary multiplied by time involved plus cost of vehicle and travel time, i.e., (\$25 - \$35 × 6 hours) + \$18/day + mileage for a speech related to this model.</p>

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NEFCO	<p>Fact Sheets- \$1,500 for 1,000 copies of each 8½" x 11" double sided fact sheet (black and white), \$3,000 if in color</p> <p>Pamphlets - \$1,500 for 1,000 copies of each 8½" x 14" double sided pamphlet (black and white) \$3,000 if in color</p> <p>Public meetings- \$1,200 (for a 2 hour meeting with 20 hours for preparation, 8 hours for mailout / news release, and 2 hours travel / set-up time and \$80 for copying costs)</p> <p>Slide show- \$3,000 and up for an 80-picture slide show</p>
Cuyahoga River Community Planning Organization	Information Booth- \$1,000 and up for professionally created display, volunteers \$8/hour
Summit SWCD	One day school event- Approximately \$450, figuring on a six-hour event at \$20/hour, plus two days to put materials and presentation together (Earth Day). Material costs minimal
Wayne SWCD	<p>Normally, school events are one to three days and expenses are generally limited to staff time, with relatively little money spent on supplies (a sampling kit, for example). The following, however, is an example of a more ambitious school program in which higher costs were involved:</p> <p>Two day school event- Two students from each of ten districts participated, along with their teachers. Included the following expenses (budgeted), from grant and matching funds:</p> <ul style="list-style-type: none"> • \$1,400 for radio broadcasting of public service announcements put together by students • \$900 for substitute teacher pay • \$470 for food • \$350 for T-shirts • \$50 for folders and journals • \$1,000 for a video promotion and summary of the event • \$50 for mailing and printing • \$1,500 for SWCD staff time <p>In addition, \$500 were contributed by the Farm Bureau for stream monitoring kits and \$250 was spent on ten sets of slides for aquatic insect identification.</p>

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Shaker Lakes Nature Center	<p>According to Jeremie Maehr, the cost of stream stewardship and related activities can and has varied widely. In the past, many components of such projects have been procured free of cost, from donations. Some examples are:</p> <ul style="list-style-type: none"> • \$500 for Earth Day festival, plus staff time. Music and food were donated, as were materials for “recyclable arts and crafts” demonstration. • \$5,000-\$10,000 for Watershed tour by trolley, with tent stations set up along the way. • \$100 per Brook Walk or Watershed Tour
<p>C. Actions involving public participation - The process of attaching a cost on activities associated with increasing public participation and/or awareness of watershed issues is a trickle-down occurrence. Agencies do not specifically scope out meeting costs or speech costs, but usually apply or start with a block of money and spend from there. When the money begins to dwindle, the agencies seek additional funding.</p>	
<p>C1. Volunteer Events - These events are case specific, some will be more expensive than others. Certain variables will be involved, such as starting from “scratch” or repeating a program. Attaching specifics costs would involve itemizing everything within the project. The following are some examples (<i>Refer to actions 2.1b, 2.3c2, 7.1c, 7.2b</i>):</p>	
Cuyahoga River RAP	<p>For volunteer clean ups, you need to know how many hours are needed, how big the event will be, how many volunteers will participate, if you already have a database of names or need to build one. The ODNR formula for estimating the cost to pick up and remove litter including food and equipment is:</p> <ul style="list-style-type: none"> • \$8/hour per volunteer • \$25/ton to dump trash (need to multiply in cubic yardage).
Summit SWCD	Storm drain stenciling - volunteer time plus a one-time materials cost (\$75/stencil kit)
<p>C2. Ongoing volunteer programs - These programs are case specific, some will be more expensive than others. Certain variables will be involved, such as starting from “scratch” or repeating program. Attaching specifics costs would involve itemizing everything within the project. The following are some examples (<i>Refer to action 7.2a</i>):</p>	
Ohio Parks and Recreation	<p>Ohio Greenways Program:</p> <ul style="list-style-type: none"> • \$10,000 for initial start-up for a volunteer campaign (staff, training and materials) • \$2,000 - \$3,000 for the annual cost after start-up to continue training once a year and to do a follow-up.
NEFCO	<p>Volunteer Lake Monitoring Program (VLMP)</p> <ul style="list-style-type: none"> • \$3,600/year to run program and compile a report summary+ initial start up cost

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D. Actions involving implementation	
<p>D1. Developing and passing legislation (such as zoning regulations) - (Refer to actions 1.4a, 2.1c,e, 2.3 b3, b4, b5, c3, d1, d2, 2.4a, 3.1a1, a2, a4, a5, b2, 4.1c)</p> <p>Estimating the cost of drafting and enacting legislation is very difficult, especially since the time needed for the process is so variable. Some bills are 1,000 pages in length, while others are only one sentence. The process may involve hiring consultants, attorneys, and/or additional staff, holding multiple public meetings, responding to legal challenges, etc. And, the process may occur over months to years. Thus, it is not useful to attach even a cost estimate to drafting and enacting legislation. For zoning rules:</p> <ul style="list-style-type: none"> • Realizing costs begins with a process started by local/community zoning boards, which usually hire a consultant to perform assessments and actual writing of the codes based on their findings. The costs to community boards are variable depending on site-specific variables. This consultant plan is developed and voted upon, and serves as the “upholding of ...zoning legality”. • The cost of getting zoning regulations passed are those associated with the public process or voting it in or having it passed by a board. Meetings where the public/officials attend cost only the time of those who attend. • Enforcement costs would revolve around salaries of zoning inspectors. In enacting new codes, cost is not an issue unless new inspectors would need to be hired because of new codes. Legal or sanction actions also have costs, but those are going to be case specific and impossible to anticipate. Alternative ways of funding might include a bond system or other method of having a fund to use for various enforcement, repair and restoration costs resulting from citizen’s actions. For illustrative purposes only, examples of local area zoning costs: 	
Local Government	<p><i>City of Hudson:</i> \$100,000 and up to develop a plan to enact a riparian zone ordinance, requiring:</p> <ul style="list-style-type: none"> - One hundred foot setback for residential use from stream and wetland areas (some problems when wetlands are cited). One hundred foot setback for non-residential, able to be mitigated (50 ft.) <p><i>Bath Township:</i> \$55,000 to hire 3 consulting firms to develop a plan and ordinance for riparian buffer codes. The ordinance would restrict land use activity within 75 feet from the high water mark of named and forty feet from the high water mark of unnamed watercourses. Changes to the topography, among other activities would not be permitted in these areas.</p>

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D2. Sewer extensions and associated permitting and inspections (<i>Refer to action 1.1e [1.2e]</i>)	
Summit County Department of Environmental Services (Permitting and connecting to existing lines)	<p>Current regulations require any housing unit or commercial building to get a permit to connect to sewer systems. Cost for permits varies as to whether an area has been assessed in accordance with a treatment plant or not. Some areas of this watershed have, some have not. Fees are based on number of benefits (1-family, 2-family, restaurant, etc.), frontage and trunking.</p> <ul style="list-style-type: none"> • \$110 for inspection fee • \$1,600 for flat/frontal fee • \$400 - \$2,360 for connection fee (project dependent) • \$4,300 for public improvement for City of Green to tie-in, \$2,500 benefit for restaurant to tie-in. • \$20 for 6 months of monitoring, which is included in sewer fees and is based on the amount of frontage - \$.20 per foot on top of that after 100 feet.
Summit County Department of Environmental Services (Extensions)	\$9,000/home and up (\$12,000 - \$15,000/home for Sagamore Hills area and \$20,000/home in Stow)
D3. HSDS and SPSDS repair, replacement, and inspections (<i>Refer to actions 1.1a, b, 1.2a, b</i>)	
Summit County Health Department (Inspections)	<p>The following costs are based upon an estimated 30,000 HSDSs in Summit County.</p> <ul style="list-style-type: none"> • \$352,000/year for a once per year inspection of all systems in existence within the county. The cost is based on salaries of 6 inspectors, 1 supervisor and one clerical professional. • \$200,000/year for a selective time and age-dependent inspection plan, i.e., inspecting off-lot discharge systems once a year, on-lot systems once every five years.
Local Health Departments	<p><i>Summit County Health Dept:</i></p> <ul style="list-style-type: none"> • \$3,000-\$6,000 (average cost) to replace a faulty system <p><i>Stark County Health Dept:</i></p> <ul style="list-style-type: none"> • \$5,000-\$8,000 to replace an HSDS (new systems require hiring a soil scientist to perform soil testing) • A few hundred to \$1,000 to repair. This requires a \$90 fee for a sanitarian's work. Hiring a backhoe operator is also required (at variable costs)
Ohio EPA	<p><i>Ohio EPA, Division of Surface Water:</i></p> <p>\$10,000- \$15,000 for SPSDS replacement. Ohio EPA is responsible for reviewing the plans for these.</p> <p>In some cases, replacing an old (pre-EPA) system will require an upgrade to an "extended aeration package plant" which will cost at least \$40,000. This determination is made based on the facility being served by the SPSDS.</p>

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D4. Landfill inspection and operation (Refer to action 2.1a1)	
Solid Waste District, Local Health Department	<p><i>Summit County Health Dept:</i></p> <ul style="list-style-type: none"> • \$41,000/year based on sanitary inspector's salary <p><i>Summit Solid Waste Management:</i></p> <ul style="list-style-type: none"> • \$35,000 - \$40,000/year to operate a CD&D landfill. (\$6,000/year from licensing and the rest from Solid Waste Authority.
D5. Hazardous waste drop-off site (Refer to actions 2.1d and 2.3c4)	
Solid Waste Districts, State and Local Health Departments, Private Sector	<p><i>Summit Solid Waste Management:</i></p> <p>\$400,000-\$500,000 to operate from April thru September, two days/week. This is based on the only permanent drop-off site in Summit County, which is located on Graham Road in Stow. Of the waste collected in 1999, 83 percent was recycled. Additional costs include:</p> <ul style="list-style-type: none"> • \$10,800 for brochure production and distribution • \$5,000 for radio advertising • \$1,000 for brochure distribution to county subdivisions <p><i>Cuyahoga County Solid Waste:</i></p> <p>\$400,000 for three day collection twice per year. One collection is from cities who sign up to participate in the program. A second collection for the general public (has brought up to 1,000 cars per day) is held in the Fall. Cities sign up and develop their own collection system for the community, realizing minimal costs (some additional labor and storage space) and the County picks up the collected household hazardous waste.</p> <p><i>Portage County Solid Waste:</i></p> <p>In 1991 and 1992, household hazardous waste collection occurred at Kent State University. Approximately 1500 cars per event arrived and the total cost of the collection and disposal, per event, was approximately \$150,000 or \$100 per car. The wastes collected by the County are recycled and sold, when possible.</p>
D6. Stream Restoration (Refer to actions 4.2a, b, c)	
ODNR, park districts, consulting firms, grassroots organizations, etc.	<p><i>Metro Parks Serving Summit County:</i></p> <p>For example, the cost to restore 1,300 linear feet of stream along Furnace Run (Summit County) was as follows:</p> <ul style="list-style-type: none"> • \$17,500 for the Environmental Design Group, Inc. to conduct design/research • \$350,000 for the Metro Parks to do construction/building (involved two channels, one draining 420 acres and the other 1,580 acres, base flow of 4.3 cfs towards a lake, excess of this diverted to restored channel. Used 300 linear feet of root wads, 7 vortex weirs, 8 reduced size step pools and 10,000 live branches). • Some of the more specific costs involved in the restoration were as follows: <ul style="list-style-type: none"> • \$49,300 for root wad purchase and installation (300 linear feet) • \$3,900 for vortex rock weirs (60 tons) • \$1,195 for rock check dams (20 cubic yards) • \$13,037 for landscaping (seeding/grading, shrubs and trees)

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<p>D7. Monitoring - The cost of monitoring depends various factors including what type of monitoring will be performed (chemical, bacterial, macroinvertebrate, etc.), how many sites will be monitored and how often, what types of reports will be generated, and who will do the work (volunteers or personnel).</p>	
<p>D7a. Stream monitoring (<i>Refer to action 7.2b</i>)</p>	
<p>Organizations involved vary, such as Ohio EPA, County SWCDs, NEFCO, and volunteer groups</p>	<p>These costs do not include the cost of taking the sample from the source, filling out the necessary paperwork, and transporting it to the laboratory for testing:</p> <p><i>North Coast Laboratories</i> # :</p> <ul style="list-style-type: none"> • \$8 - 12/sample for nutrient testing (NO₃, NO₂ and P) <p><i>AquaTech Analytical Laboratories (ATEL)</i> # :</p> <ul style="list-style-type: none"> • \$12 - \$35/sample for most "typical" tests (NO₃, NO₂, NH₃, P, BOD, Fe, etc.) <p><i>Summit Environmental Technologies</i> # :</p> <ul style="list-style-type: none"> • \$20/sample for nutrient testing (NO₃, NO₂ and P) <p><i>AquaTech Analytical Laboratories (ATEL)</i></p> <ul style="list-style-type: none"> • \$12.50 - \$20/sample for fecal coliform and e.coli bacteria testing <p><i>NEFCO (Using ODNR Scenic River Methodology for macroinvertebrate sampling):</i></p> <ul style="list-style-type: none"> • \$3,500 for monitoring four sites twice a year and compiling the results into a report <p>The cost for volunteers to monitor would be minimal, if equipment is available or borrowed from the County SWCD. Otherwise, kits cost approximately \$40 and include (for one company) a kick seine net (poles not included), thermometer, magnifying cubes, plastic jug, hand lenses, and a monitoring field book. Additional equipment, like forceps can be purchased separately.</p> <p><i>NEFCO VLMP monitoring for water clarity and color in lakes:</i></p> <ul style="list-style-type: none"> • \$3,600/year to run program and compile a report summary+ initial start up cost
<p>D7b. Stricter NPDES monitoring requirements for WWTPs (<i>Refer to action 1.4a</i>)</p>	
<p>Ohio EPA and WWTPs affected</p>	<p><i>Ohio EPA:</i></p> <p>To require new permitting systems for additional parameters and adding additional plants to monitor would not be cost prohibitive. The majority of the cost would go to the WWTP owner/operator. NPDES permit requirements are always changing, currently the cost is:</p> <ul style="list-style-type: none"> • \$200 for a NPDES permit application fee and additional fee each year based on discharge amount and number of outfalls. • Additional costs depending on the cost to test more frequently or for additional parameters. Approximately \$20 per sample tested for any given parameter.

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D7c. Integrated Pest Management and precision farming (<i>Refer to action 5.1.c</i>)	
ODA, OSU Extension, County SWCDs, NEFCO	<p>IPM and precision farming both rely heavily on monitoring of agricultural fields for various problems ranging from pest infestations to low or excessive soil moisture and nutrient buildup.</p> <p><i>OSU Extension Office (Summit-Stark Co.):</i></p> <p>Integrated Pest Management: Farmers can be trained or hire a scouter. A scouter may charge \$25/acre, depending on the pest scouted for and the time period appropriate for that pest.</p> <p>Precision Farming: This amounts to driving through the field and monitoring for pH, soil moisture, nutrient levels, etc. and then creating a computer map (using GPS points) of the field and what areas have special needs regarding fertilizer, water, etc. Then, a variable rate technology is used to treat the field appropriately. This may involve many different expenditures:</p> <ul style="list-style-type: none"> • A combine costs ~\$250,000 and many are now equipped with a GPS unit and yield monitor. The two units may cost \$6,000-\$8,000 if added to an existing combine. • Hiring someone to monitor and create a grid for you (pH, soil testing, etc.) may cost \$2,000 for a 50 acre farm. • Variable rate technology may add \$5,000-\$8,000 to a \$30,000-\$40,000 corn planter or fertilizer applicator. • Hiring someone to actually use variable rate technology to apply chemicals to your field may add \$8/acre on top of \$10/acre for regular applications.
D7d. Monitoring of Underground Storage Tanks (<i>Refer to action 2.4b</i>)	
SFM/BUSTR, NEFCO, Private Sector	<p><i>Petroleum Systems, Akron, Ohio# (performs tank upgrades and replacements):</i></p> <p>As of December, 1998, all tanks that do not meet federal requirements had to be upgraded with monitoring and corrosion protection systems, along with a series of monthly and yearly monitoring requirements. Any tanks which currently do not meet these requirements would be in violation of the law and would need to be removed and replaced. It is the owner's responsibility to keep tanks monitored and meeting the requirements and all expenses fall on the tank's owner. Costs are extremely variable, depending upon the nature of the existing system and the operation it services.</p> <p><i>Bureau of Underground Storage Tank Regulations:</i></p> <p>Information on problem areas can be obtained directly from BUSTR, via their data base of Leaking Underground Storage Tanks (LUSTs) and Regulated Storage Tanks. Information is free but copies costs \$0.05 each.</p>

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D7e. Monitoring of Salt Storage Facilities <i>(Refer to action 6.1a):</i>	
ODOT, Local Government, NEFCO, Private Sector	<p><i>Frank Shenck, Head of Facilities, ODOT District IV:</i></p> <p>Salt storage facilities are not formally inspected except once per year for a building inspection. Actual management of salt piles is monitored on a day to day basis through working with the material itself. All incidents or problems are reported to the Head of Facilities. The process is not regulated and therefore does not require any specific monitoring or inspections.</p>
D8. Conservation easements- The cost of setting up, purchasing and maintaining conservation easements will depend on the level of negotiating involved in setting up the terms of the easement, size and purchase price of the land to be set aside, and cost of personnel and degree of monitoring the easement after set-aside. <i>(Refer to actions 4.1a,b)</i>	
Local land trust, park district, or government entity	<p><i>Summit SWCD:</i></p> <p>Estimated costs are as follows:</p> <ul style="list-style-type: none"> • \$0 - \$1,000/acre and up for purchase, i.e., \$3,500/acre for land along Tinker's Creek in Twinsburg, Ohio • \$4,000 set-up and maintenance fee <i>(Jeff Holland, Attorney)</i> <p>Note: Sometimes landowners will donate land in the form of an easement as a charitable gift, which can lead to significant tax savings for the landowner and their heirs.</p>
D9. Constructed wetlands - Costs will vary upon many environmental variables. <i>(See A1, Refer to action 1.3e)</i>	
County SWCD, NEFCO, local health departments	<p><i>Summit SWCD:</i></p> <ul style="list-style-type: none"> • \$70,000 for two separate sites totalling 2.5 acres (open pond and a celled-diversion project) <ul style="list-style-type: none"> • \$25,000 for construction • \$7,000 for engineering • \$3,000 for plants <p><i>NEFCO:</i></p> <ul style="list-style-type: none"> • \$42,000 for a two-celled wetland designed to treat waste from one home (612 sq. ft. in size). This cost includes design, construction, materials, plants, maintenance, photo documentation, public outreach and a written report with results (monitoring costs were not included).

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<p>D10. Agricultural BMPs - The initiation of various agricultural BMPs called for in the action plan will be site specific. It is not possible to say what it will cost to implement a settling tank or buffer strips until exact dimensions and parameters are known. <i>(Refer to actions 1.3b, c, d, 3.2b, 5.1b3, e)</i></p>	
<p>ODA, ODNR - NRCS, and County SWCDs</p>	<p>Examples of Costs for Site Projects</p> <p><i>Wayne SWCD:</i></p> <ul style="list-style-type: none"> • \$1500-\$2,000 or more for out of stream watering. A trough fed by a well is less expensive. Developing a spring-fed system is more expensive. • Settling and/or filtration system for runoff from feedlots. These can be either a sand filter followed by a buffer strip, or simply an excavated pond that overflows (after settling manure) onto a buffer strip at low slope. This costs approximately \$2,500 • Stream crossing (for small streams). This is a “newer” form of bank erosion control and involves excavation of a channel, laying down a geotextile fabric and covering with crushed gravel. Approximate cost is \$1,800 on average • Manure and nutrient management plan. NRCS does not charge farmers for these, however the land owner must submit soil samples (at least one per ten acres, at \$12 each) and a manure sample at \$35 for analysis. SWCD may use 12-16 hours to develop a plan at ~\$20/hour for a cost of ~\$240-\$320 • \$35,000-\$40,000 for earthen, lined manure pit; up to \$70,000 for cement storage (based on 100 dairy cows) <p><i>Summit SWCD:</i></p> <ul style="list-style-type: none"> • \$10,000-\$50,000 for an above-ground cement manure storage receptacle • \$15,000 - \$20,000 for an earthen detention pond (lagoon) with liner <p><i>Portage SWCD (from 1994 estimates):</i></p> <ul style="list-style-type: none"> • \$4.70 / linear foot for barbed wire fencing (four strand) • \$1,200 / acre for seeding and mulching • \$3.60 / linear foot for grassed waterway • \$3.20 and \$2.60 / linear foot, respectively for grassed and straw bale lined diversions
<p>D11. Construction codes and regulations - In Summit County, the SWCD reviews developer/construction plans, and if codes are not met, plans (specifically SWPPPs) are not approved. Changes to the codes or requirements would cost the amount of labor to change the actual documents and meeting costs, to get them approved. Inspection/monitoring/enforcement costs could be tallied as a building inspector’s salary (varies by community). <i>(Refer to actions 3.1b1, 3.2b, 3.3 a, b)</i></p>	
<p>County SWCD</p>	<p><i>Summit SWCD:</i></p> <ul style="list-style-type: none"> • \$20/acre for plan review fee (paid by developers, inspections made every other week per site) <ul style="list-style-type: none"> • \$10 for preliminary review • \$10 for stormwater pollution prevention plan • Summit County engineer charges \$18-\$25 / hour for storm water inspections, observing soil movement, sewer line installation, etc.

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Organizations*	Description of Cost(s)**
D12. Construction BMPs and innovative erosion control methods (Refer to actions 2.3d3, d4, 3.1a3, b3, b4, c, 6.1b)	
County SWCD, County Engineer, USDA/NRCS, Private Sector	<p><i>Portage SWCD estimates (from 1994 figures):</i></p> <ul style="list-style-type: none"> • \$1,200 per acre for seeding and mulching to maintain vegetated buffer strips and riparian zones near construction sites (approximately \$0.25 per sq yd) • \$0.25-\$0.30 per seedling for purchase • \$0.11-\$0.15 per seedling for planting • \$0.04 herbicide per seedling • \$50 for more mature trees (with burlapped root ball, tree and labor) • \$3.20 per linear foot for grassed water diversion <p><i>Summit SWCD:</i> \$10,000-\$50,000 per basin for settling and storm water, depending on size and features \$3,000 per acre for one-inch thick topsoil layer, necessary for proper seeding in many instances \$0.45 per square yard for seeding</p> <p><i>Invisible Structures, Inc. #, Aurora Colorado, maker of Grasspave# and Gravelpave#, two porous pavement materials:</i> Grasspave is for periodic use while Gravelpave is more appropriate for continual use, as in a store parking lot. Both consist of a "ring and grid" structure which is laid over a roadbase course and then backfilled with coarse sand or gravel. Grasspave is seeded or sodded to provide a grassy surface which rejuvenates when not being used. The following cost estimates are for 5,079 square feet (470 m²) installed Grasspave (Denver, CO costs) and were provided by Invisible Structures:</p> <ul style="list-style-type: none"> • 10" roadbase graded - \$3,288 • Grasspave product, delivered by common carrier (gasoline surcharge may also apply) - \$9,612 • Labor to install Grasspave - \$253 • 1" sand layer - \$253 • ½" thin cut sod installed - \$1,518 • Total cost - \$14,925 <p><small>Note: Grasspave and Gravelpave are priced currently at a maximum of \$1.77 and \$1.86 / square foot, respectively</small></p> <p><i>Franks Foliage and Landscaping, Wooster OH# (general figures, actual costs are site specific):</i></p> <ul style="list-style-type: none"> • \$1.25-\$1.80/ sq yd for fiber erosion control blanketing installed, depending on material and ease of installation • \$0.50-\$1.10/ sq yd for hydroseeding depending on application rate needed and preparation (grading and preparing soil for example) • ~\$1.50 / sq yd for "bonded fiber matrix", a more innovative erosion control product, mixed with seed and applied from hydroseeder <p><i>R.B. Stout Co., Bath, Ohio# (approximate costs, individual sites vary)</i></p> <ul style="list-style-type: none"> • seeding and hydroseeding (hydroseeding performed only where an existing irrigation system exists) at \$0.06/ft² • mulching installed at \$30-\$35/ cubic yard (spread three inches deep) • erosion control netting (put into place over straw and seeding to prevent erosion) at \$0.75/ sq. yard.

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Cost Analysis and Explanations for The Upper Tuscarawas Watershed Action Plan

Organizations*	Description of Cost(s)**
<p>D13. Well abandonment/drilling/enforcement - These costs are site specific. Many variables are involved to determine the exact cost of drilling and abandoning wells. Some General guidelines follow (<i>Refer to action 2.6a, b</i>)</p>	
<p>Ohio EPA/DDGW, ODNR/DOW, NEFCO, State and Local Health Departments</p>	<p><i>Anderson Drilling & Pump, Inc. # :</i></p> <ul style="list-style-type: none"> • \$250 - \$300 for a bentonite hole plug in a residential well of 5 inches in diameter and 100 feet deep. • \$16/ft. For residential drilling and casing placement. • \$1,400 for pump installation • \$600 - \$700 for industrial drill, 8-10 inches in diameter and 200-300 feet deep <p><i>Stark Co. Health Department (estimated costs based on previous experience, 125' well of 5" diameter):</i></p> <ul style="list-style-type: none"> • \$200 - \$300 for concrete plug, \$250 for clay plug, \$250 - \$300 for bentonite plug • \$150 for plumber to pull out wiring and pump (if applicable) but often will not charge customer for this • \$40 fee for inspection and paperwork. This is normally realized at the time of sewer hookup/well abandonment • additional costs to repair the integrity of the landscape around the well <p>Note: The Stark Co. Plumbing Department will not issue a permit for sewer hook-up unless the drinking water well is sealed properly. This acts as an enforcement mechanism that does not add additional costs to procedures. Otherwise, the Health Department charges \$600 per year for two inspections of the open drinking water well.</p>
<p>D14. Road Maintenance Actions</p>	
<p>D14a. Alternative de-icing materials (<i>Refer to action 6.1c</i>)</p>	
<p>County Engineer</p>	<p><i>Summit County Engineer:</i></p> <p>Trial of Iceban # (organic compound mixed with magnesium chloride) for road pretreatment. Has shown moderate efficacy in some cases. Cost estimates are as follows:</p> <ul style="list-style-type: none"> • \$0.75 per gallon (applied currently at 20 gallons/lane-mile for a cost of ~\$15/lane mile) • \$9,000 per liquid tank applicator to retrofit trucks (currently have three in the fleet but, if trial period is successful, may want to add an additional three tanks, for a cost of ~\$27,000) • \$600-\$800 for retrofitting process (1-2 days work) • training costs are minimal (1-2 hours) <p>For comparison, calcium chloride:</p> <ul style="list-style-type: none"> • \$0.42 per gallon (currently being applied at 30 gallons/ lane-mile for a cost of ~\$12.40/lane mile) • has proven effective as a preventative treatment

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Cost Analysis and Explanations for The Upper Tuscarawas Watershed Action Plan

Organizations*	Description of Cost(s)**
D14b. Regular Street Sweeping (Refer to action 2.3d5)	
Public Works Departments ODOT	<p><i>Akron Public Works:</i> For residential areas:</p> <ul style="list-style-type: none"> • \$0.56 per frontage foot for minimum of ten sweepings per year, including two leaf collections • April 1 - December 17 <p>For commercial areas:</p> <ul style="list-style-type: none"> • \$1.92 per frontage foot for two sweepings per year (routes such as Main and Market Streets)
D15. Implementing a Regional Stormwater Management Plan (Refer to action 2.3a)	
ODNR/DSWC, County SWCDs, County Engineer, NEFCO	<p><i>Dodson-Stilson, Inc. "A Framework For The Development of a Stormwater Management System for Summit County, Ohio":</i></p> <ul style="list-style-type: none"> • \$300,000 start-up costs for each of the first two years • \$150,000 annually thereafter • Costs would potentially become distributed among county and local entities as successes and benefits are demonstrated.
<p>*Task (action) accomplishments are not limited to these organizations, but are presented as examples. Costs will vary for each organization and situation. **The cost information was provided by personal communications with entities named in the right hand column. Where no source is given there, the communication was made with the single Coordinating Party named in the left hand column. Personal communications were conducted in October and November, 1999 and January-March, 2000.</p>	