

FREQUENTLY ASKED QUESTIONS ABOUT SUMAS MOUNTAIN ASBESTOS, SWIFT CREEK AND SUMAS RIVER

The U.S. Environmental Protection Agency (EPA), along with local, state, and other federal agencies, has put together responses to “frequently asked questions” from community members that live near Swift Creek.

Swift Creek, which flows into the Sumas River, contains high levels of naturally occurring asbestos. Creek sediments are exposed when water levels are low, when the creek is dredged or when floods deposit material on banks and adjacent properties. Asbestos can become airborne when this asbestos-containing sediment is disturbed. This could happen during activities like walking or riding on sediments, or if the sediments are used for home construction projects, such as driveways or pathways. When asbestos becomes airborne, it can be breathed into the lungs and increases the risk of developing asbestos-related disease.

The “frequently asked questions” have been divided into nine categories:

1. About asbestos
2. How did this happen?
3. What does this mean for my health and the health of my family?
4. Asbestos studies
5. The issues around Swift Creek asbestos
6. How far has the material spread?
7. The problems with using Swift Creek sediment
8. Proposed solutions and responses
9. Who’s doing what — and why?

About asbestos

1. What is asbestos?

Asbestos is a naturally-occurring mineral that is made up of thin fibers. The fibers are difficult to see without magnification and are found in certain types of rock or soil. Asbestos fibers do not have a noticeable odor or taste. The fibers do not dissolve in water or evaporate and are resistant to heat, fire, chemical and biological breakdown. Because of these properties, asbestos has been mined and used in a wide range of manufactured products.

Find more information here: <http://www.epa.gov/asbestos/pubs/help.html>

2. If asbestos is natural, why is it a problem?

Naturally-occurring asbestos is the same material as the asbestos regulated in products. Asbestos is of most concern when asbestos fibers are released into the air. When asbestos is in the air, it may be breathed into the lungs. This could increase the chance of developing asbestos-related diseases such as mesothelioma, lung cancer, or asbestosis. Asbestos can be released into the air when asbestos-containing soil is disturbed, for example by people, machines, or animals. It can also become airborne when the wind picks up asbestos fibers from dry sediment or when wet asbestos fibers carried on shoes, clothes, or other surfaces dry out.

3. Can asbestos in water be released into the air?

Asbestos in water does not usually get into the air. In fact, keeping asbestos wet is the best way to keep the fibers from getting into the air. However, if water containing asbestos evaporates, as it might after flooding, when sprayed on soils and crops, or when mud on shoes and clothes dry, the dry asbestos left behind can get into the air when disturbed.

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4. What kind of asbestos is in Swift Creek?

Most of the asbestos found in Swift Creek is a type of asbestos called *chrysotile*. Chrysotile is made up of flexible and curved fibers and is the primary form of asbestos in the serpentine group.

5. Is chrysotile asbestos as bad, or worse, than other types of asbestos?

All types of asbestos are hazardous, and all types can cause cancer and other health effects. Chrysotile, with flexible and curved fibers, differs from amphibole forms, which have brittle, needle-like fibers. The exact mechanism by which asbestos causes illness is unclear. At this time, EPA considers serpentine (e.g., chrysotile) and amphibole asbestos forms to have the same potential to cause cancer.

6. Is asbestos still being used in this country? If so, why are we so concerned?

Because asbestos may harm peoples' health, [EPA has banned all new uses of asbestos](#). Asbestos is no longer mined in the U.S. However, imported asbestos (mainly chrysotile) is still being used to make roofing products, gaskets, and car parts like clutch, brake, and transmission parts in factories subject to environmental and worker safety regulations.

How did asbestos get into Swift Creek?

1. How did asbestos get into Swift Creek?

Swift Creek starts on Sumas Mountain on a rock formation that contains asbestos. Part of that formation was affected by an ancient landslide, which was re-activated in the late 1930s or early 1940s. As water comes down Sumas Mountain into Swift Creek, it picks up asbestos-containing rocks and soil in the landslide and carries them downstream.

2. What caused the landslide to be reactivated?

Several record rainfalls occurred in the 1930s and it is thought that they caused the Sumas Mountain landslide to be re-activated. While logging on steep slopes can contribute to landslides, this is not believed to be the cause behind re-activating the Sumas Mountain landslide.

3. Is the landslide a physical hazard?

The re-activated landslide has been moving downhill for about 60 years. A few studies of the slide have been done, including several by Western Washington University (WWU). Our limited knowledge of the slide suggests that it's not very likely that a catastrophic release of landslide material will occur. However, sediment and logs could be carried downstream when water in the creek is high and flowing fast. This is also when Swift Creek and the Sumas could see increased flooding.

What does this mean for my health and the health of my family?

1. How could I be exposed to the Sumas Mountain/Swift Creek asbestos?

Walking, dirt biking, ATV quad riding, operating farm equipment, or riding horses on the Swift Creek or Sumas River banks, dredge piles, or the floodplains where asbestos-containing sediments have been deposited will disturb the soil and may cause asbestos to get into the air. Farming or other agricultural activities in areas with asbestos-containing sediments or soils also could result in release of fibers to the breathing zone. The asbestos can also get into the air if sediment from the creek or river is used for construction projects, such as driveways, pathways, or work or play areas.

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2. What is the health risk associated with asbestos?

Exposure to asbestos occurs when asbestos fibers get into the air and are breathed into the lungs. In some cases, when significant exposure to asbestos has occurred, the fibers can damage the lungs or membranes that cover the lungs. When this happens it may cause the development of asbestos-related disease such as lung cancer, mesothelioma, or asbestosis. Mesothelioma is a rare cancer caused by asbestos and occurs in the lung covering or in the lining of the abdominal cavity. Asbestosis is a scarring of the lungs that decreases the lung's ability to function. Pleural plaques can also develop, which are characterized by a thickening and hardening of the lining that covers the lungs and chest cavity, making breathing difficult.

More information can be found at:

http://www.atsdr.cdc.gov/Asbestos/medical_community/working_with_patients/

3. Does air blown dust from the dredged piles stored along Swift Creek pose a health threat?

EPA has placed a substance called a “soil tackifier” on the dredged sediment piles along Swift Creek. This acts like a glue on the soil and reduces the amount of windblown dust and asbestos released from the piles. As a result, the health threat is also reduced. However, when the sediment piles are disturbed by foot traffic or motor vehicles the “soil tackifier” becomes less effective. There is no tackifier on Sumas River sediments and flood deposits.

4. What if I suspect there is asbestos at my workplace?

The Washington Department of Labor and Industry regulates worker exposure to chemicals, including asbestos. They can assess the work environment, if requested by an employee or employer. If you are concerned about your work environment, please contact L&I: David C. Johnson at (360) 902-5514 (en Español: Pedro Serrano at 360 902-5419).

5. How do we know that non-industrial exposures to asbestos are a problem?

There are communities that have used asbestos-containing material and seen an increase in health effects. For example, for many years people in a part of Greece used whitewash made from a local material that contained asbestos. In cases like this, rates of mesothelioma were found to be higher than normal.

6. What if I've been exposed to asbestos?

You should tell your doctor if you think you have been exposed to asbestos, even if you don't feel sick. Most people don't show signs or symptoms of asbestos-related disease for 10 to 20 years or more after being exposed.

7. Can an x-ray or other medical test show whether I've been exposed?

Chest x-rays are the most common method of detecting asbestos-related diseases, like lung cancer. However, X-rays cannot determine if a condition is asbestos-related. Healthcare providers usually identify the possibility of asbestos exposure and related health conditions, like lung and pleural disease, by taking a thorough medical history. Early identification of mesothelioma and intervention can increase chances of survival.

8. Is anyone in Whatcom County sick as a result of Swift Creek sediments?

We are not aware of anyone in Whatcom County who is sick from being exposed to asbestos in Swift Creek sediments. However, it is important to note that most people don't show any signs or symptoms of asbestos-related disease for 10 to 20 years or more after they have been exposed.

9. Have any studies been done of potential health impacts of Swift Creek asbestos?

The Washington Department of Health conducted a study in 2008. The study found no evidence of higher rates of asbestos-related disease (mesothelioma and lung cancer) in

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the community near Swift Creek compared to Whatcom County or the state of Washington as a whole. The study will be updated in 2009 to include recent data and consider a larger area, near the Sumas River.

It is important to note that although elevated rates of these diseases have not been found in this community, minimizing exposure to asbestos is still important to reduce your health risk.

The health consultation can be found here (you will need [Adobe Acrobat Reader](#)):
http://www.doh.wa.gov/ehp/oehas/publications_pdf/HealthConsults/0802swiftcreek.pdf

10. If people in Swift Creek aren't getting sick, why should I be concerned?

Asbestos is a known human carcinogen (may cause cancer). It can also cause non-cancer health effects like lung disease. Currently, there is no evidence that community members near Swift Creek are getting sick. However, it is still important to minimize exposure to asbestos.

11. What are the effects of asbestos on children?

The effects of asbestos on children are thought to be similar to the effects on adults. However, children could be especially vulnerable to asbestos exposures because they are more likely to disturb asbestos-containing soils or indoor dust while playing. Children also breathe air that is closer to the ground and may be more likely to breathe in airborne asbestos fibers.

It is also important to note that children who are exposed to asbestos could be more at risk of actually developing asbestos-related disease than people exposed later in life. This is because children would have more time between exposure and the onset of asbestos-related disease.

12. How much is considered a safe level of asbestos?

As with other carcinogens, even a small amount of asbestos increases the chance that a person will develop cancer. However, the following factors play a role in whether or not a person develops asbestos-related health problems:

- How much asbestos they are exposed to
- How long the exposure lasts
- How often they are exposed
- How long since the first exposure
- Smoking history (smokers are more likely to see health effects)
- Pre-existing lung conditions

As a general rule, contact with substances that are known to cause cancer should be avoided if possible, and if unavoidable, should be minimized.

There is insufficient scientific information to know what a safe level of asbestos is in soil. Instead, we monitor air during common activities (such as walking, dirt biking or gardening) to determine whether the asbestos in the soil can get into the air you actually breathe. This type of study is called "activity-based sampling". There is a great deal of scientific information on risks from air-borne asbestos, so measurements of asbestos in the air can be used to estimate the potential risks to people exposed to the soil during these activities.

13. What is the background asbestos level in the area?

We have not compiled data to answer this question, and additional data may be needed. While asbestos-bearing rock is present in various areas of the Cascade Mountains, streams that pass through such areas are likely to have less asbestos than Swift Creek, where the exposed Sumas Mountain landslide is actively eroding. In the Sumas valley, the soil was

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created from soil left by retreating glaciers, so asbestos is probably at very low levels, if it is present at all.

14. What is an acceptable risk and who decides what is acceptable?

EPA considers cancer risks in the range of one additional cancer in a million to one additional cancer in ten thousand to be generally acceptable (National Contingency Plan, 40 CFR §300.430). These risk estimates are typically calculated for an individual exposed to a cancer-causing chemical for a reasonable maximum exposure (30 years is often assumed for residential settings). This is a policy decision and one that is generally accepted by federal, state, and local environmental and health agencies.

15. What is the “relative risk” posed by the asbestos at Swift Creek and Sumas River when compared to other things?

The risk posed by the asbestos from Swift Creek is relatively small when compared to other risks, such as those associated with smoking. However, even small risks need to be investigated, assessed, addressed, and information about possible health effects and ways to reduce exposure provided to community members. Reducing exposure to asbestos will reduce the risk of asbestos-related disease.

16. Is anyone investigating the health risks in the Sumas Valley?

The Washington Department of Health’s study found there is no evidence of elevated asbestos-related disease rates (mesothelioma and lung cancer) in the community near Swift Creek (including a part of the community along the Sumas River), compared to Whatcom County or the state of Washington as a whole. However, as noted above, although no elevated disease rates were found in this community, minimizing exposure to asbestos is still important.

To better understand the levels of asbestos and metals in the Sumas River, EPA tested sediment, soil, and water between Everson and the Canada border in May 2009. Elevated levels of asbestos and some metals have been found. The agencies are notifying landowners and surface water users about this situation and the health advisory is being updated to reflect this new information.

EPA ‘s activity based study in Swift Creek

EPA conducted an activity-based study of the sediment piles next to Swift Creek, reporting the results in 2008. EPA field staff in respirators and coveralls, with air testing devices near their faces, performed typical activities such as riding bicycles, raking, shoveling, and walking/running. These tests measured the number of asbestos fibers from the “breathing zone” air. Air samples were also collected from fixed locations near where activity-based sampling took place. However, only the samples from the “breathing zone” were used to estimate health risks from the activities.

Swift Creek site information: <http://yosemite.epa.gov/r10/cleanup.nsf/sites/swiftcreek/>

1. Activity based sampling was done during some of the driest times of the year. Wouldn’t the amount of airborne asbestos be lower most of the time?

EPA believes conditions during testing probably do not overestimate asbestos exposure. The activity-based sampling was conducted in summer, when people are more likely to come into contact with Swift Creek sediments. During the sampling event, the dredge piles were still moist from recent rain. Under dryer conditions, we might expect more asbestos to become airborne. Under wetter conditions, we might expect less asbestos to become airborne during testing, but because moist sediments can stick to clothes and shoes, more asbestos could be tracked into cars or buildings, resulting in possible additional exposure.

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2. Did EPA assumptions about how long or how often people are exposed overestimate the risks?

EPA believes the assumptions are reasonable for most people and may underestimate the risks for some people. EPA estimated that the amount of time people were exposed to Swift Creek sediments was relatively brief (see report for details). A person's actual exposure may be more or less frequent. However, it's possible, even likely, that some people are exposed to asbestos from Swift Creek by more than one pathway. For example, some people could be exposed to asbestos in the dredged sediments along the creek and also to asbestos carried indoors on their shoes or clothing and also to asbestos in sediments deposited in their yard either intentionally or because of flooding. For people with multiple exposures, actual risks could be higher than EPA's estimate.

3. Personal air sampling devices had readings 10 times higher than stationary sampling. Why?

The results from personal air sampling are often about 10 times higher than those from nearby stationary samples. This is due to the "dust cloud" (usually not noticeable) people create as they move through the environment.

Issues around Swift Creek asbestos

1. Didn't we already know there was asbestos in the sediment?

Swift Creek sediments have been known to contain asbestos since at least the 1950s. However, the amount of asbestos in the sediments was not known until the 1970s and, at that time, the levels were considered safe. In recent years, we have learned more about asbestos and how -- even at low levels -- it can increase the chance of developing asbestos-related diseases such as mesothelioma, lung cancer, or asbestosis.

2. Why can't Whatcom County, or anyone else, dredge Swift Creek like they used to?

Dredging is not prohibited, but there is no more room along Swift Creek for the dredged materials, as was done in the past. Because there is no room to dispose the sediment along the creek, dredged sediments would need to be transported to an appropriate disposal facility. This would be expensive because of the high volumes of dredged asbestos-containing sediment that would need to be transported and disposed.

Also, since activities that disturb Swift Creek sediments and soil can cause asbestos fibers to get into the air, dredging and handling practices must protect workers and nearby community members. Such practices add to the cost of dredging.

3. Why wasn't storing materials along the banks an issue before?

Storing dredged sediments along the banks of Swift Creek was not an issue in the past because contractors and individuals would haul away and use the material, making room for more sediment to be stored the following year. Removal of sediments was allowed then because it was thought that the asbestos levels in the sediment were not a health concern. Today, we know that even at low levels asbestos can increase the chance of developing asbestos-related disease. Because of this, removal of the sediment is strongly discouraged.

4. Who owns the dredged sediment along the banks of Swift Creek and Sumas River?

In general, if the sediment was deposited by flooding or if a property owner gives permission for dredged sediment to be placed on his/her land the owner of the land will most likely own the sediment. However, if the sediment was deposited by dredging, who owns the sediment depends on the specific details of the dredging agreement between the property owner and parties doing the dredging. Property owners that have dredged sediments on their land may want to discuss this issue with an attorney for further clarification.

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5. If the landslide happens on private land or a flooding event deposits materials on private land, is the landowner responsible for solving the problem?

The answer to this question may depend on many factors. Interested property owners may wish to seek independent legal advice based on their situation.

6. Why can't the material be taken away and used as fill?

The dredged material from Swift Creek should not be taken away and used as fill because the sediment contains high concentrations of asbestos. It has been shown that when the sediment is disturbed, the asbestos fibers can be released into the air and then breathed into the lungs. When that happens, it can increase the chance of developing asbestos – related disease such as mesothelioma, lung cancer, or asbestosis.

7. Are there any regulations that apply to moving/using the material?

Clean Water Act regulations would apply if the material was dredged or placed as fill in waters of the United State, which includes wetlands. Worker protection requirements would apply to moving the material and to reusing the material. Other regulations may apply, depending on the situation.

8. Why is it so expensive to fix this problem?

It is expensive to fix the problem because there is such a large volume of material that contains asbestos entering Swift Creek from the Sumas Mountain landslide. Each year, between 25,000 and 150,000 cubic yards of material enters the creek.

When exposed to asbestos, workers and community members increase their chance of developing asbestos-related disease. As a result, protective measures are needed when handling the material. For example, more safety equipment and monitoring are needed to ensure worker protection, as well as measures to prevent community members from being exposed to the asbestos. Transporting and disposing of the material safely is also costly, especially for such large volumes.

9. If I have Swift Creek or Sumas River sediment on my property, will this affect my property value?

The answer to this question may depend on many factors. Interested property owners may wish to seek independent legal advice based on their situation

How far has the material spread?

1. Is the problem with asbestos in Swift Creek going to spread to the Sumas River?

Tests indicate that asbestos from Swift Creek has traveled into the Sumas River. It's recently been found in the water and the sediment deposited in and next to the river. For many years, asbestos has been detected in pump filters on the Canadian side of the border. This indicates that asbestos has been moving into the Sumas River for quite some time.

Some parts of the Sumas River have flooded or been dredged in the past due to sediment build-up. Although there is no sampling data, it could be assumed -- based on current information -- that some of the dredged Sumas River sediment may have originated in Swift Creek and may have contained asbestos. As sediments continue to fill in the Sumas River, the likelihood of flooding and asbestos-containing sediment being deposited along the river will increase.

2. If there is asbestos in materials carried down Swift Creek and the Sumas River, do all of the Swift Creek and Sumas floodplains have asbestos?

The Swift Creek and Sumas River floodplains were first formed from sediments left behind by retreating glaciers during the "ice age". The glaciers carried materials from across the region, so it's likely that older sediments in the floodplain contain low levels of asbestos, if any. Sediments deposited along Swift Creek and Sumas River since the Sumas Mountain

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landslide became active are likely to contain higher levels of asbestos. Additional testing would be needed to better answer this question.

3. What about Swift Creek material taken off-site in the past? Where is it now?

In the past, no one kept track of where Swift Creek sediments were taken. So today, little is known about where the material is located or how it was used. Some information indicates that it was used for construction projects and by individuals for driveways and pathways. Currently, there are no plans and no funding to address past uses on private property. Testing in some public areas is being considered. For now, the health agencies are providing health information to potentially affected community members. This includes information about asbestos, its possible health effects, and ways people can reduce or eliminate their exposure to asbestos in the sediment.

4. Do gravel pits in the area contain asbestos?

We have not tested gravel pits for asbestos. At pits located in floodplain material, we would expect to find less asbestos than in areas of asbestos-bearing rock types. We are aware of one area where Swift Creek material was used as a gravel source. Because of the possible health threat posed by asbestos, that work stopped.

5. How can you protect workers and the public if you don't know where the asbestos is?

The health agencies prepared an advisory about asbestos in Swift Creek sediments in 2008. It was mailed to approximately 8000 properties around Swift Creek to educate the communities possibly affected by the material. An update regarding the Sumas River sediments was sent in July 2009. The advisories provide information about asbestos, its possible health effects, and ways people can reduce or eliminate their exposure to asbestos if they have Swift Creek or Sumas River sediment on their property. Both are available on [Whatcom County Health Department's webpage](#).

For questions about potential work-related exposure to asbestos, please contact David Johnson at the Washington Department of Labor and Industries at (360) 902-5514.

The problems with using Swift Creek or Sumas River sediment

1. Why can't we use the sediment?

Swift Creek sediment contains high levels of asbestos. When the sediment is used as fill, or in other projects, the asbestos fibers can be released into the air and breathed into the lungs. This could increase the chance of community members (both users and non-users of the material) developing asbestos-related diseases such as mesothelioma, lung cancer, or asbestosis. It takes extra health and safety precautions in order for workers to handle the material, not only for current use but for any worker who might have to move, cut or excavate the material in the future. Use of the material (i.e. for fill) should not be done without taking specific precautions to avoid exposing people to asbestos and preventing future disturbance of the material. For this reason, the agencies strongly discourage use of the material.

2. Would diluting the material make it more usable?

The possibility of diluting the asbestos-containing sediments was evaluated. It was found that even when up to 50 percent (%) asbestos free material was added to the sediments, the material would still have asbestos levels that pose a health threat. As result, dilution won't help. In fact, it would most likely just increase an already large volume of asbestos-containing material that needs to be managed safely.

3. Is there any way to separate the asbestos from the other materials?

There is no way to separate the asbestos-free material from asbestos-containing material. Material in the Sumas Mountain landslide includes some rock that does not contain

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asbestos, but most of it does. Testing shows asbestos fibers are found in all the different sizes of the asbestos-bearing rock (rock, gravel, sand).

4. Wouldn't there be a lower risk of exposure if it was used for fill in roads and other big construction projects?

If the material is covered by a paved road or other large construction project, the chances of exposure to the asbestos would likely be very small. Because the asbestos levels will not decrease over time, the material would need to be monitored as long as it remained at the property to make sure that it remained covered and no one (workers, residents, customers) was being exposed. For workers at these sites (including future workers who may excavate, say for utilities), this would mean that additional health and safety measures would need to be taken to prevent asbestos exposure. These are significant (and potentially expensive) tasks for the property owner, who would likely be legally responsible for this material.

5. Does off-site use as fill beneath roads generate conditions of risk that are "acceptable" when compared with other alternatives and scenarios, such as flooding?

A large amount of dredged sediments are currently stored along Swift Creek. If dredging continued, the amount of sediments being stored would increase. There are currently no large-scale construction projects planned in the Swift Creek area today, or in the near future, where such volumes and type of material would be needed. Even if there were future needs, users of the material may find that the worker protection, long-term monitoring, and liability issues make using non-Swift Creek materials more attractive.

6. Are there ways to keep asbestos fibers from becoming airborne while asbestos-containing sediments or soils are being handled?

Wetting sediments or soils that contain asbestos before handling them helps minimize fibers from getting into the air. While this is one of the best ways, it is not perfect. If possible, avoid handling these materials.

7. Can the stream be used to separate the higher concentrations of asbestos?

Sediments moving downstream are to some extent sorted by particle size. There are areas where higher concentrations of smaller particles are found, and these areas have high asbestos concentrations. In fact, high levels of asbestos fibers have been found in sediments along the length of Swift Creek and downstream Sumas River. Because asbestos is also present in larger particles, which break into smaller particles relatively quickly, sorting by size would not eliminate the problem.

Proposed solutions and responses

Whatcom County has studied the issue of the landslide and continuing erosion into Swift Creek. In addition, many ideas have been offered by community members. The scale of the problem will require a comprehensive solution and funding.

1. Why can't we do something to keep material from getting into Swift Creek?

There are methods to reduce the amount of asbestos-bearing sediment getting into the Swift Creek. One example of a possible method is to build a detention basin, where sediments would settle out in the upstream portion of the creek. However, methods like this are very expensive. The recently awarded \$1 million in state funding for Swift Creek only provides a very small fraction of the money needed for such a project (total project cost estimated at over \$20 million).

2. Can we divert water away from the slide area?

The landslide is about a mile long, one-third mile wide, and is on a slope. The water falling on the landslide flows into Swift Creek. There is not a significant drainage basin

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larger than the slide itself. Even if some water could be diverted, the size and steepness of the landslide makes this very difficult (and expensive).

3. Can we cover the slide with less permeable material to reduce infiltration?

It is expected that the landslide will remain active (slow downhill movement) for at least another 400 years. Covering an area this large and unstable might be possible, but it would be very expensive to install and maintain a cover impermeable to water over the lifetime of the landslide.

4. Can we build a dam or buttress to stop the slide?

Earlier engineering studies have concluded that building a dam at the bottom of the slope is not a practical option. The dam would have to be huge to hold back the weight of such a large slide and would be dangerous to construct.

5. Can we build drainage structures on or in the landslide?

Building drainage structures on or in the landslide is not a practical solution. Any drainage structure installed on or through the landslide would need to be designed to account for the downhill movement of landslide material. Once installed, the structure would need constant monitoring and maintenance to make sure it worked and did not increase the movement of the landslide.

6. Can we push pilings through the material to a stable substrate?

There are a few things that make this an impractical solution. The landslide is about a mile long, one-third mile wide, and may be several hundred feet thick. This means that many, very long pilings would need to be installed to try to stabilize the slide. It's also important to recognize that working on the surface of the landslide to install such long pilings, even if possible, would be extremely difficult and potentially unsafe.

7. Can we use gravel mines in the area for disposal?

Using closed gravel mines to dispose of the dredged sediments is an option being considered. However, if metals found in the sediments could dissolve and get into the groundwater, this option would be unsuitable. Whatcom County is currently conducting a study to see if this could happen. If the study shows that the material would not affect groundwater, this could be an option for managing dredged material. However, transportation costs may be high and the land-owner would need to sell his or her land or agree on restrictions for future uses of the fill area to assure effective long-term isolation of the asbestos-containing material.

8. Can we capture the material below the landslide?

The agencies are considering a number of options for capturing material below the landslide:

- Build a small dam and pond, or other structures, to slow the flow and let sediment settle out; remove the sediments as necessary and dispose at a nearby containment facility
- Dredge Swift Creek and the Sumas River; truck dredged sediments to a nearby containment facility
- Dredge sediments and truck to nearest gravel pit for disposal
- Construct "setback dikes" and allow area to fill in
- Let natural settling occur

However, each option described above needs further evaluation to determine if it's possible. Some of the issues that would need to be evaluated include:

- land acquisition costs
- wetlands assessment and possible mitigation for impacts to wetlands from constructing the alternative
- restrictions on access and land uses within the areas where the sediment is managed.
- availability of nearby gravel mines
- construction costs and long term operation and maintenance costs

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9. If we did dredge, what could we do with the dredged material?

Safe re-use of the dredged sediment would be very difficult. The following re-use options have been suggested, but so far none is promising for the near future, because none of these options fully address the risk of exposure to asbestos in the material.

- Mix it into a commercial product like asphalt or concrete
- Sort it and sell the rocks and sand and gravel
- Dilute it with unaffected rocks, sand, and gravel
- Use it as-is in a single, defined and controlled large scale project (like a major road)

Disposal involves costly handling and transportation and a suitable disposal site. These options have been suggested:

- Dispose at an asbestos approved landfill (the nearest site is hundred's of miles away)
- Dispose at a nearby facility constructed specifically for this material
- Fill a nearby gravel pit
- Use as fill in large development site (like the Port of Bellingham)
- Use it to create berms or raise the ground level nearby

Treatment to destroy the asbestos has also been suggested. Treatment is generally very costly, but treatment technologies will be considered. Testing would be needed to demonstrate that they work and to estimate costs, if so.

More work will need to be done to evaluate these possible options. However, it is important to keep in mind that many of these options are expensive. Also, most focus on dredged material but would not reduce the movement of asbestos particles too small to dredge.

10. What would happen if we didn't dredge, if we allowed nature to take its course?

With no dredging, the Swift Creek channel will fill and flooding will occur. Upstream flooding could spread asbestos and metal-containing sediments over nearby lands, slowing the creek and possibly reducing the movement of asbestos downstream.

11. Could additional risk scenarios be run for some of the practical situations we are talking about? For example, if the material is used under a roadbed with other material, then what is the risk of exposure if it is dug up in 50 years when worker exposure to a mixed sample is one or two days out of a lifetime.

Additional risk scenarios may be evaluated when a set of practical solutions are identified. However, asbestos does not break down over time, so it is important to ensure that actual future exposures are what you assume it will be (worker exposure for a short period). Making sure future workers are aware of and protected from the asbestos requires information about the asbestos where people will find it. Land uses change over time, and environmental agencies are often faced with cases where a lack of information has led to homes being built on contaminated land.

Who's doing what —and why?

1. Who is in charge?

The involvement of agencies at the federal, state, and local level is needed to address the variety of issues surrounding naturally occurring asbestos in Swift Creek. The many agencies involved with this issue fill different roles.

2. What agencies are involved, and why?

Whatcom County has requested assistance from federal and state agencies regarding Swift Creek. This is because the Swift Creek project is so large, the issues are so complex, and the costs to address the problem are so high.

Currently, the main environmental agencies involved with Swift Creek include:

- U.S. Environmental Protection Agency
- Washington State Department of Ecology
- Northwest Clean Air Agency

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The health agencies include:

- Whatcom County Health and Human Services
- Washington State Department of Health
- Agency for Toxic Substances and Disease Registry (also known as ATSDR)

Also involved at this time are:

- Whatcom County Public Works
- U.S. Army Corps of Engineers
- Washington Department of Labor and Industries
- Washington State Department of Natural Resources

3. What have the agencies done to help?

The agencies have helped:

- Better define how much asbestos is in the sediment
- Determine how exposures to asbestos might occur
- Evaluate the health threat posed by the asbestos
- Provide the community with information about asbestos and ways to reduce exposure
- Explore options for dealing with the asbestos contaminated sediments
- Advocate for state and federal funding

4. Isn't the government responsible for keeping the rivers from flooding?

The US Army Corps of Engineers can, during a flood event, augment local government flood response efforts. Local governments are primarily responsible for flood response. Please remember that neither local nor federal agencies can stop flooding.

5. Who is going to manage this problem?

Federal, state, and local agencies will continue to work to help manage the problems and seek solutions for issues related to the Sumas Mountain landslide, Swift Creek, and Sumas River. The agencies involved are committed to this work as their role and resources allow.

There are a number of other communities across the country also being affected by naturally occurring asbestos. To help manage the problem, some communities have imposed zoning and testing requirements as part of land use planning.

In El Dorado County, California, for example, local land-use permits require geologic study and documentation of construction and waste management practices. In Fairfax County, Virginia, a plan must be approved before construction occurs. In the future, local or state level changes, similar to this, will likely be needed in areas affected by asbestos carried downstream from Sumas Mountain landslide.

6. How can I help?

Community members can help by:

- Participating in community meetings to better understand the issues
- Providing agencies with important information about the community
- Forming a community group (EPA may be able to provide resources to assist you)
- Becoming informed about the health issues related to asbestos
- Following recommendations in the health advisory and posted warning signs regarding Swift Creek and Sumas River