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## Disaster Spotlights Regulatory Failure

### Right-to-Know Law Sought

Testimony from both Union Carbide officials and Kanawha Valley citizens before a House subcommittee in December revealed serious gaps in regulatory control over toxic substances and safety and evacuation plans. The Subcommittee on Health and Environment of the House Energy and Commerce Committee held hearings in Institute, West Virginia, on December 18th, less than two weeks after the Bhopal chemical disaster which claimed over 2,500 lives.

Meeting on the campus of West Virginia State College, less than a mile from a plant virtually identical to the Bhopal facility, the Subcommittee heard repeatedly that toxic chemicals posed not only a threat of massive destruction but a persistent health hazard.

Even Union Carbide President Warren Anderson acknowledged the need for better regulations. "What this tragedy will set in motion is a complete reevaluation of regulations," he said.

Committee Chairman Henry Waxman (D-CA) outlined the committee's intention of making sure the Bhopal tragedy was not repeated. "None of us can avoid the responsibility of taking the actions necessary to assure this community—and all communities where chemical plants are located—that major catastrophic emissions—or dangerous levels of more routine emissions—do not occur," he said.

Committee members Barbara Milkulski (D-MD), James Florio (D-NJ), and Gerry Sikorski (D-MN) along with West Virginia District Congressman Bob Wise questioned witnesses in detail on safety systems at the plant. Carbide's Jackson Browning testified the Institute plant included a computer system for logging data on temperatures and pressures within the system, but said no safety response is triggered by the computer. "There is not a relevant difference between safety features here and there."

Milkulski honed in on evacuation plans and emergency preparedness in the community, with Carbide officials insisting a workable warning system and evacuation plan was in place in the form of the 1981 document prepared by the Kanawha Valley Industrial Emergency Planning Council. But Milkulski said state officials had provided the subcommittee a different plan—a 1975 docu-

ment describing emergency responses to nuclear attack.

She asked why state and industry officials didn't even agree on which plan was the real plan, and wanted to know if the paper plan was really just "fat, flabby and untried."

Carbide officials seemed at a loss to describe actual evacuation drills except one conducted at the West Virginia Rehabilitation Center. Community residents testified they had no idea what to do in case of a disaster and had never been invited to participate in a drill.

Residents focused much of their testimony on routine chemical emissions and specific gas leaks which had caused some permanent health damage.

Donald Wilson, a Kanawha County teacher and Institute resident, described a 1975 incident which left his entire family ill with flu-like symptoms, persistent coughing, and long-term effects on breathing. "We've learned to stay inside when there's no wind," Wilson said. He described how he had tried to form a group called "Survival" to work on air pollution problems after the incident, but found people afraid to take on the chemical industry.

Eighty-four-year-old Miriam Hamblin was asked whether people were afraid of losing jobs. She replied, "Yes. They feel they will be threatened. We don't want to do anything that will be harmful (to the community), but we know full well something needs to be done."

Two Conservancy members testified at the Subcommittee hearings. State Senator Tod Kaufman posed many of the questions plaguing his Kanawha County constituents after the Indian tragedy. "Are the evacuation plans adequate? Do people...know what to do when the whistle sounds? Do they even know what the whistles mean? Should they get into their cars? If they do, do they know which direction to go?" he asked.

Kaufman also raised questions about medical preparedness and the nature of other toxic chemicals in the Valley. "Realistically, we may be surrounded by deadly substances—but we are kept from knowing—a condition I believe is intolerable," he said.

Ironically, a fire siren mounted on top of the administration building where the hearings were held began to sound during the questioning of

community witnesses. In the uncertain moments which followed before word was passed to the committee that the siren signaled a fire off-campus, several committee members and witnesses suggested that this moment clearly characterized the problem in the community.

Perry Bryant represented West Virginia Citizens Action Group, a Charleston-based organization which has long been active on toxic and hazardous waste issues. Detailing the routine emissions of hazardous materials into the air from production plants and wastewater treatment facilities, Bryant emphasized the need for regulations and public knowledge about toxic substances.

According to Bryant, federal law only governs hazardous wastes, but does not address problems associated with substances during production, shipment and storage. EPA was

charged with the responsibility of regulating toxic substances, he explained, but of some 60,000 chemicals only seven have been officially listed as hazardous and only four have been subjected to regulations. The chemical produced at Institute and responsible for the Bhopal disaster, methyl isocyanate (MIC) is not among the seven.

Bryant was one of several at the hearing who expressed concern about the fact that Congress and the regulatory agencies had basically ignored the toxics problem until forced by this industrial disaster to face the problem. (Excerpts of Bryant's testimony are printed on page 2.)

WV-CAG presented the subcommittee with petitions containing 12,000 signatures collected before the Bhopal disaster. The petitioners ad-

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## WVHC Opposes Export of Water by Proposed Coal Slurry Pipeline

Last month the West Virginia Highlands Conservancy announced its opposition to a coal slurry pipeline proposed by the Baltimore Gas and Electric Company (BG&E) for construction in 1986 between Mingo County, West Virginia, and Baltimore, Maryland.

WVHC President Larry W. George made the announcement after filing a statement of WVHC's position with the Joint Committee on Coal Slurry Pipelines of the Maryland General Assembly.

The 400-mile BG&E pipeline would transport coal from Mingo, Boone and Nicholas Counties, crossing northeast to a final loading point at Westernport, Maryland, before pushing east to the port of Baltimore. The pipeline would withdraw substantial amounts of water, free of charge, from three West Virginia rivers—the Guyandotte, Little Coal and Gauley. BG&E

proposes to sell the water to consumers in the Baltimore area after dewatering of transported coal. The company estimates pipeline construction to cost \$615 million and to continue from 1986 through 1988.

George said, "The Conservancy believes the BG&E coal slurry pipeline may jeopardize water quality, and public water supplies in the Guyandotte and Coal River watersheds by withdrawing critical river water during the frequent periods of low river flow. West Virginians are compelled to oppose the free export of our state's water for sale in Maryland without first protecting water quality, public health and municipal water supplies in our own state."

BG&E proposes to withdraw 8.1 and 1.9 cubic feet per second (cfs), respectively, from the Guyandotte

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### Winter Meeting January 19-20

(see page 6 for details)



# Bhopal Brings Toxics Problem Home

(Editor's note: The following includes excerpts from the testimony of Perry Bryant, representing WV-CAG, before the Subcommittee on Health and Environment of the House Energy and Commerce Committee in Institute, W.Va. on December 14, 1984. Bryant is also Vice President of State Affairs for WVHC. The complete text of his testimony is available from WV-CAG, 1324 Virginia Street East, Charleston, WV 25301.)

...It is indeed depressing and unfortunate that we are here today because of the tragedy that occurred in Bhopal, India. It is also unfortunate that it took the death of well over 2,000 human beings in a foreign country to bring us here to ask questions about the toxic chemicals stored in our valley and routinely discharged into our air.

...We are glad you are here today to do what you can to protect us from the possibility of the type of disaster that overtook the people of Bhopal. But we have to remember too that toxic chemicals can kill over a period of years as surely as they do within a space of hours. The same kind of controls that guard against sudden catastrophe can also protect us from long-term, slow harm.

We can't afford "not to know" anymore. Here in the Kanawha Valley, both sudden and long-term harm to our health can come from at least four sources...storage of toxic substances, transportation of toxic substances, toxic air emissions, and treatment of toxic wastewater. Although all four of these problems are with us every day, many citizens have little or no information about them. It is often said that the citizens of this valley have chosen to live with these dangers, but I submit that people can't choose to live with dangers until they know what they are.

1. Exclusive concentration of methyl isocyanate (MIC) obscures the larger problem. MIC is not the only lethal substance stored in the valley. For example, chlorine and phosgene pose as serious a threat to human health—if not a more serious threat—than does MIC. ...Nobody but company officials knows how much chlorine and phosgene is stored in the valley or what safety devices are in place. Even the West Virginia Air Pollution Control Commission (APCC) and the United States Environmental Protection Agency (USEPA), by all indications, have no real information about what is being stored, how much is being stored, and what safety precautions are being employed to prevent a sudden uncontrolled release of chlorine or phosgene.

The citizens of the Kanawha Valley who are forced to assume the risk of storing...toxic substances within their community have no way whatsoever to obtain this information, under existing law. Nor do they have any input into the decision to store super hazardous materials within their community. We find this an unconscionable situation, one that must be changed.

...while we now have a strong regulatory law governing hazardous waste, the storage of super hazardous substances is virtually unregulated.

The distinction between hazardous waste and hazardous substances makes no sense in terms of human health. Both are toxic. Both can cause catastrophic illness or death. The distinction between the two in the regulations appears to exist primarily for the convenience of the regulated community, the chemical industry.

WV-CAG urges that the Congress amend the TSCA (Toxic Substances Control Act) to include the following:

- A requirement that USEPA conduct a survey of the storage of super hazardous substances...

- A requirement that USEPA make this information easily available to the communities where super hazardous materials are being stored. ...USEPA should also be required to adequately inform the community, through town meetings and other media, of the super hazardous material being stored in their area and of the health risks involved in varying degrees of contact with these materials.

- TSCA should require a permit for storage facilities not covered by the new Subtitle I of RCRA (Resource Conservation and Recovery Act)...

2. I sincerely hope that Congress will not only address the concerns about storage of super hazardous substances, but will also act to tighten controls on the transportation of hazardous substances. ...Do the people who live along these shipment routes have a right to know what risk they are being exposed to? Do Health Departments, Fire Departments, Emergency Service personnel have a right to know what super hazardous substances are being transported through their communities and a right to be prepared for accidental releases of MIC, phosgene, chlorine, or other materials?...

3. Thirdly...Congress must act to reauthorize the Clean Air Act and address the issue of toxic air emissions. ...During the fourteen years that the USEPA has been charged with the protection of human health against toxic air emissions, they have...officially designated as 'hazardous' only seven toxic pollutants...(and) set standards for only four...

For more than seven years, USEPA has had "under consideration" an additional 37 pollutants, but absolutely no final determination has been made on any of them. Of these 37 pollutants, sixteen are routinely discharged into the Kanawha Valley air. These sixteen chemicals account for more than 767 tons of pollution in our air per year. Five of the sixteen are listed as carcinogens by the National Toxicology Program.

This is not a case of "Can it happen here?" It happens here every day. We live in a long narrow valley which traps and concentrates these pollutants without the dispersal possibilities found elsewhere. According to...records between 1968 and 1972, Kanawha County residents experienced an increase in respiratory cancers 25% above the national average. Between 1973 and 1977, we experienced an increase 21% above the national average.

4. ...Many people...do not know that hazardous substances are discharged

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into the air here from wastewater treatment facilities.

...In...1980...the EPA outlined its posture toward wastewater treatment facilities which handle hazardous waste. EPA stated in part that they "believe that wastewater treatment facilities that treat hazardous waste...do pose a potential hazard to human health or the environment... These facilities may generate toxic mists, fumes, gases, extreme heat or pressure, or cause a fire, explosion, or violent reaction if improperly operated."

Despite their own conclusions, EPA adopted, on the same day, a final rule exempting wastewater treatment facilities from RCRA and Clean Air Act permitting requirements...

In other words, wastewater treatment facilities, no matter what toxic materials they contain, are presently exempt from regulation; therefore the toxic mists, fumes, and gases about which the agency expressed concern go unregulated...

I would also suggest that this lack of political will to enforce the

(Continued on Page 3)



# Conservancy Requests Otter Creek Minerals Purchase

The West Virginia Highlands Conservancy has asked Secretary of Agriculture John Block to proceed with acquisition of privately owned mineral rights underlying the Otter Creek Wilderness Area in Tucker County, West Virginia. Conservancy President Larry George filed the request with Secretary Block in late November.

The 20,000-acre Otter Creek Wilderness Area was designated by Congress under the Eastern

Wilderness Act of 1975 and is administered as part of the Monongahela National Forest by the U.S. Forest Service, an agency of the Department of Agriculture. Although all surface lands are federally owned, approximately 18,500 acres of underlying mineral rights are owned by a subsidiary of the Island Creek Coal Company. Federal law prohibits disturbing the Area's surface for mineral production.

The Department of Agriculture

earlier refused to compensate Island Creek as required by federal law through acquisition of the mineral rights. In 1982 Island Creek sued the agency in the U.S. Court of Claims to compel compensation. The Court held the lawsuit in abeyance pending administrative decisions by the Forest Service and the U.S. Office of Surface Mining regarding Island Creek's property rights and the compatibility of coal mining and gas drilling with wilderness management.

On July 20, 1984, OSM determined that Island Creek held "valid existing rights" to the mineral property. On November 1, 1984, the Forest Service issued a determination that coal mining and gas drilling were incompatible with management of the Wilderness Area.

George said, "The recent decisions of the Forest Service and the Office of Surface Mining leave no doubt that Island Creek holds valid property rights to the mineral estate and that the Company is prohibited from developing most of its minerals by the

Area's wilderness status. The Secretary of Agriculture should proceed through either negotiation or condemnation with acquisition of those coal and gas deposits Island Creek cannot develop without disrupting the surface of the Otter Creek Wilderness Area."

Both Island Creek and the Department of Agriculture have proposed developing some coal and gas deposits from mine portals or gas wells located outside the Wilderness boundary to reduce federal acquisition costs. The Conservancy generally supports this approach, but will judge the company's proposals on a case-by-case basis.

WVHC led the successful campaign which resulted in Congressional designation of the Otter Creek Wilderness Area in 1975.

Title to the approximately 18,500 acres of mineral rights is held by the Otter Creek Coal Company, a wholly-owned subsidiary of the Island Creek Coal Company.

## New Controls on Tall Stacks

Power producers once called it "punching" and touted it as a method of reducing pollution. But the method of pushing emissions into higher atmospheric layers to disperse pollutants over a wider area is finally coming under some controls. At a few plants, at least.

The U.S. Environmental Protection Agency recently ruled that sulfur emissions from the tall stacks must be reduced by some 3-6%, providing the plants were constructed, or started before December 31, 1970.

A Clean Air Act loophole allowed the tall stack plants to emit more sulfur dioxide and other pollutants because the key factor measuring pollution was the ambient air standard, measured not at each point-source but at monitoring stations some distance away. By "punching" pollution higher, it literally passed over the heads of local air monitors and thus skirted the tougher requirements.

Of the tall stack plants in West Virginia, the Mitchell, Harrison, John Amos, and Fort Martin plants will likely not be affected because construction began before the cutoff date. The newer Mountaineer and Pleasants plants may not be affected because their emissions have already been reduced—in Mountaineer's case by burning low sulfur coal, and in Pleasants' case by scrubbing equipment. Only the 900 foot stack at the Kammer plant near Moundsville seems likely to fall under the new requirements.

Just across the Ohio River above Point Pleasant, WV, AEP's Gavin and Kyger Creek plants may be affected. Prevailing winds carry most of their emissions over West Virginia.

AEP officials have not indicated whether they would install scrubbers or take other steps to meet the requirement.

## EPA, State Agree on Enforcement Priorities

Six state and federal officials signed off on the annual agreement for cooperation between the State and the Environmental Protection Agency during October.

The agreement addresses enforcement timelines and responsibilities for high priority problems, including hazardous wastes, toxic air pollutants, sewage and sludge disposal. In the language of the agreement, "It is intended to sustain top level management attention on multifaceted environmental problems that may not be fully addressed through routine implementation of State and Federal statutes and regulations."

The agreement sets forth individual enforcement timelines for "significant" air and water pollution violations. The air pollution response schedule calls for the state to issue a notice of violation (NOV) within 75 days of the detection and to achieve compliance or refer to hearing within 150 days. EPA monitors State enforcement and may intervene after 120 days if the State doesn't issue violation notices.

Water pollution violators under NPDES permits should receive a NOV from the State within 60 days, but compliance or legal action is not required before 180 days—a full half-year.

According to the document, if the State does not take timely action, "EPA will...take direct actions against those facilities which are

significant non-compliers...." EPA will also act on chronic violators, those "causing actual harm or an imminent threat of harm to public health or the environment," and violators which derive "a substantial economic benefit from non-compliance."

Interim authority for the State to operate the Resource Conservation and Recovery Act (RCRA) program for hazardous waste handling will run out on January 26, 1984. The State/EPA agreement details steps for West Virginia to obtain final authorization from EPA to operate the program. Unless the Legislature revises statutes and regulations during the upcoming session, the State will probably not receive final authority by mid-1985. The EPA will administer the RCRA program until the authorization is approved.

Other problems targeted by the joint agreement include disposal of oil and gas drilling pit wastes, abandoned mine drainage, solid waste, public water supply supervision, coal permitting authority, and prime agricultural land protection.

Conservancy members Perry Bryant and Mary Ratliff attended an August 27th public hearing on the federal/state agreement, but the document was not available for review at the time.

According to Bryant, the agreement at least provides the potential and the mechanism for EPA oversight of state environmental enforcement.



Interested citizens, reporters and company and state officials concentrate on the testimony.



Rep. Henry Waxman (D-CA) and Rep. Gerry Sikorski (D-MN) listen as Barbara Milkulski questions a witness.

(More Photos on Page 7)

## Bhopal brings. . .

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law—whether it be regulation of hazardous toxic air emissions from plant processes or from wastewater treatment—makes it absolutely essential that Congress amend the Clean Air Act and mandate that the USEPA act to protect our health...

Finally, members of the Subcommittee, we greatly appreciate your efforts to ensure that the tragedy that

occurred in India will not occur in the Kanawha Valley. Whether it be through sudden uncontrolled release of a lethal substance or whether it be the legal routine discharge of known carcinogens, every day we in the Kanawha Valley face the possibility of death from chemical toxins. It is only through your action that we will have a safe place to live and work.



# HYDROPOWER: THE PARADOX

## The Environmental Effects of Hydroelectricity

by David Olson and Richard Roos-Collins  
Friends of the River Foundation

(Editor's Note: The concluding part of our series on hydropower consists of excerpts from a 19-page study produced in May 1983. The authors have graciously given the Voice permission to use the paper. Unfortunately, space requirements preclude us from reprinting it in its entirety. If you'd like to read the whole study, or obtain the list of references from which the facts are taken, please write Friends of the River Foundation, Bldg. C, Fort Mason Center, San Francisco, CA 94123.)

Until recently, hydroelectric facilities were built with little regard for the protection of natural resources. Old-time lobbyists for development still argue that a "stream is wasted if it runs to the sea." As a reaction against past abuses, environmentalists and recreational users of streams oppose nearly every facility on the drawing boards. These black-and-white positions cause expensive political conflicts, and hinder regulatory review of the application.

It is a fact that the flow of the stream would be changed by construction of a hydroelectric facility. The community of plants and animals which depend on the stream would change in character, as well. In some instances, a facility would improve on nature—for example, by providing summer flows in an otherwise intermittent stream; in other instances, only the developer would benefit.

The environmental effects of hydroelectric development vary by site and region, and according to the design and operation of the facility. It is difficult to predict the probable impact of a proposed facility, even if you are familiar with operating facilities nearby. Topography, geology, climate, and assemblage of species can vary, stream by stream, even within a state.

### Design and Operation of a Project

It is safe to expect that environmental damage is proportionate to the size of the project. A series of projects on a stream alters the flow even more than a single project.

Construction of any facility damages the stream. The question is only the degree. Bulldozers and other heavy equipment inevitably cause erosion of the bank, air and noise pollution. Secondary structures, such as bridges, access roads, and power lines, may destroy wildlife habitat, increase soil erosion, and disrupt aesthetic values of the area.

Most of the facilities proposed today are "run-of-the-river," which...do not involve storage of a significant amount of water.

The famous dams built between 1930 and 1960...are all of another type, called storage.

Regardless of their classification by utilities, hydroelectric facilities

change the flow downstream. The degree of change depends not just on the design, but on the operational regime, which is determined by the requirement for regular releases to protect fisheries, and by the contract with the utility. The change from natural conditions can be dramatic. For example, releases from a project on Maine's upper Kennebec River can fluctuate from 300 cubic feet per second (cfs) to 6000 cfs during a single day. The Flaming Gorge Project on Utah's Green River has a daily range of 350 cfs to 2500 cfs.

### Alteration of the Flow

A stream, left to itself, achieves a "state of equilibrium." The flow follows certain patterns over the seasons. Certain species of insects, fish, and plants predominate. Over the years, the balance of nature may shift due to erosion, or changing weather patterns, but the evolution is generally gradual.

A dam is a new physical force in the watershed. It accelerates the rate of change, and may establish a new balance between organisms. The alteration of flow has the same effect on stream organisms as an alteration in the quantity of oxygen would have on us.

The more dramatic the daily fluctuation in release—or seasonal variation from natural patterns—the more extreme the impact on the stream. From the perspective of the fish, or recreational users of the stream, a project with wide variations in release would be the most disruptive. A sudden increase in flow can make the stream murky by disturbing sediments, and may scour rocks of algae and insects. A sudden decrease in flow would strand and expose organisms.

A constant flow may promote the growth of streamside vegetation, such as willows, which can narrow the channel. Growth of algae and rooted plants may be encouraged. Increased siltation may occur if the winter's flushing flows are controlled.

Low flow may cause wide fluctuations in the daily temperature of water, decrease the speed of the current, and lower the amount of stream habitat. Low flow in winter can encourage the formation of anchor ice which damages bottom-dwelling organisms.

To some extent in the East, and to a great extent in the West, availability of flow is the most important factor limiting the populations of organisms in the stream. Low flow reduces the depth and width of the stream.

On the positive side of the ledger, particularly in small watersheds or arid regions a storage dam can "improve on nature" during the summer and fall by providing consistent flows.

### Water Quality

Water quality is a measure of the health of a stream. Good water quality is also essential for drinking and irrigation supplies, recreational uses, and the protection of public health.

Dams alter the chemistry of a stream, by altering the flow.

A dramatic rise or drop in a stream's natural temperature would probably change the character of the stream—the species of organisms present, and their populations. As a rule, a stream's daily temperature, and the seasonal pattern of temperature, would be altered by a dam, particularly with a large reservoir.

In some large reservoirs, the water is broken into layers of temperature, or stratified. The cool, dense water at the bottom (the hypolimnion) is separated from the warmer, less dense layer (epilimnion) near the surface. The gradient of temperature is called the thermocline. Whether the release is warmer or colder than inflow depends on the location of the valve.

While a shallow reservoir may not stratify, it may warm during the summer, like a giant solar panel.

### Turbidity and Total Suspended Solids

Silt and other particles are naturally suspended in water. Dams alter the concentration of particles in water, measured by scientists and "total dissolved solids" or TSS.

The productivity of a stream depends on light. Microscopic organisms use that energy to live and reproduce, in the process called photosynthesis. Scientists use a measure, "turbidity," to determine the degree to which light is scattered, rather than transmitted, by water.

High turbidity causes discoloration of water. Photosynthesis by aquatic algae and submerged plants is inhibited, resulting in a disrupted food chain and declining productivity for the stream. Suspended particles may irritate, damage, or clog the gills and feeding structures of fish, bivalves, and zooplankton. Eggs, larva, and juvenile organisms are affected more than adults. Filter feeders such as clams and mussels are particularly sensitive to murky water.

The particles which make water murky eventually settle to the bottom. There is no more effective way (except for poison) to lower the productivity of a stream than to deposit a blanket of sediment on it. Siltation reduces the amount and variety of habitat for bottom-dwelling insects. Even more pronounced is the impact on salmonids. Silt clogs the gravels where the eggs are laid, and thus reduces the flow of oxygen and water. Eggs deposited in fine sediments rather than gravel are easy prey, while eggs blanketed in silt may simply suffocate.

### Dissolved Oxygen

Oxygen is dissolved in all water. A certain level of dissolved oxygen (DO) is necessary to maintain aesthetic qualities such as taste and odor, and also the capacity of the stream to assimilate wastes. As a general rule, the closer a stream's DO to its saturation level, the greater its biological diversity and aesthetic appeal.

As DO decreases from the ideal, so does the swimming speed, growth

rate, and reproductive success of fish. Developing salmonids (trout and salmon) are particularly sensitive to low concentrations of DO.

All hydroelectric facilities remove DO from the water. The passage through enclosed pipes and turbines has this effect.

A large reservoir may lower the level of DO downstream. It is a basic law of chemistry that the concentration of DO decreases as the temperature of the water increases: so the surface level of the reservoir, which is warmed by the sun, may be short of DO. Settling organic matter also consumes the DO of the bottom level, where water does not circulate. This pattern is particularly common in reservoirs containing high amounts of decaying matter, and during the summer and fall.

Dredging may disturb and resuspend decaying organic matter. Release of this material (which has a high demand for oxygen) can result in sudden lowering of the stream's level of DO.

### Gas Supersaturation

For short periods of time, water can become "supersaturated" by holding more of a dissolved gas than is theoretically possible. This strange phenomenon occurs at some high dams...where the water falls at high velocity down a spillway, traps atmospheric nitrogen, then forces it into solution in the plunge pools. If air is trapped in the penstock of a run-of-the-river facility, the releases may also be supersaturated.

Above 110% of the normal maximum concentration of gas, bubbles form inside fish, and can rupture tissue and organs. At 115% saturation, approximately 20% of a salmon fishery may die.

### Nutrients and Toxics

Inorganic nutrients, such as phosphorus and nitrogen, can fertilize a stream. The growth of algae, bacteria, and plants is stimulated by these nutrients. An excessive bloom of algae can choke streams, and decrease the level of DO.

Chlorinated hydrocarbons accumulate in the fatty tissues of mussels, insects, and fishes in concentrations hundreds to thousands of times greater than in surrounding water. Metals also accumulate, although to a lesser degree, in animals' flesh. Organisms such as mussels and worms, which ingest sediments, introduce these toxins in the food chain.

Due to the absence of dissolved oxygen in the hypolimnion (lower layer) of stratified reservoirs, sulfur and nitrogen compounds may decompose into toxic hydrogen sulfide and ammonia. Hydrogen sulfide stinks, and upon release can cause fish kills downstream.

### Fisheries

Because of the strong public interest in fisheries, regulatory agencies make maintenance of this resource a key goal of their decisions.



# OF CLEAN ENERGY: PART IV

A stream with healthy fisheries is probably in good shape.

In the nineteenth century, a miner would carry a canary with him in order to detect unhealthy levels of carbon monoxide. If the bird began to drop, the miner would get out as quickly as possible. In a similar way, fisheries are a prime indicator of conditions in the stream.

It is difficult to define the impact on fisheries of the "typical" hydroelectric facility. In a survey of nearly 50 streams in California, the U.S. Fish and Wildlife Service determined that just under half of the dams enlarged the downstream fisheries, while the rest were disasters. As a rule, a dam on a coldwater stream would lower the size of the downstream fishery, while a reservoir is likely to contain more fish than the warmwater stream which it replaced.

### Instream Flow Methodologies

Special scientific techniques have been developed for predicting how a proposed project would affect downstream fisheries. To some degree, every technique is an art, not a science the accuracy cannot be guaranteed. A stream contains dozens or even hundreds of species of organisms, dependent on each other and on certain patterns of flow, temperature, and water quality. Altering even one stream pattern may have unexpected impact on the life of the stream. Still, the better techniques can be used to anticipate the basic changes which would occur upon construction of a facility.

All of the reliable techniques estimate the current availability of habitat in the stream, and the likely change in habitat once flow is altered.

(The report discusses in detail two general methodologies, "areal" and "microhabitat." The areal approach is based on maintaining certain habitats, and may use a "discharge" method based on historical flows, a "hydraulic rating" method to relate habitat loss to reduction in flow, or a "preferred discharge" method to maintain habitat fish "prefer" or need. Specific methods are described, although the information is too extensive to include here. A portion of the discussion on the microhabitat approach is included below.)

The second kind of approach, called microhabitat, is intended to do more than maintain a certain quantity of wet area; it can be used to make recommendations which protect those areas which a particular species of fish depends on. In terms of sophistication and reliance on actual field surveys, the microhabitat approach is at the top of the scale, while the areal methods based on historical flow are at the bottom. Certain areal methods, such as preferred discharge or hydraulic rating, differ from the microhabitat approach only in that the critical habitat is identified less precisely.

The Instream Flow Incremental Methodology (IFIM) is currently the "state of the art" technique for assessing instream flows. It can be used to predict how much usable habitat will be available for a given fish species at a given life stage under various flow regimes.

This method is highly accurate as a means of estimating the damage (or good) which would be done by a proposed facility, and as a means for setting the appropriate level mitigation.

In the regulatory process, the local resource agency makes recommendations for minimum flow. In order to do that job, the state department of fish and game may tell the developer to conduct a reconnaissance survey using a discharge or (better yet) a hydraulic rating method. If a significant resource is at stake, then an IFIM may be required.

Some methods...produce recommended flows, generally a fixed percentage of current flow. Most methods are not so automatic, and are used to assess the impact of various flows on the size of the fishery. Using the IFIM, a biologist can predict that a certain flow would lessen the suitable habitat (and presumably the fishery) by 5%, while another flow would lessen the habitat by 25%. What is an acceptable size for the fishery? What is an acceptable loss?

A biologist would not make that decision. Instead the developer would use the study to create a flow allocation curve, and the resource agency would decide whether the level of loss (implied by the allocation curve) is acceptable. The regulatory agency would resolve any dispute between the developer and the resource agency. Picking the proper size of the fishery is a value judgement, not the result of scientific equation.

### Resident Trout

Trout are particularly sensitive to changes in water quality. Temperatures above 20° C, which can result from reduced flow or from release of warmer water from reservoirs, decrease the growth rate for trout and their swimming speed, while their metabolisms increase. Trout have a great deal of difficulty extracting oxygen from water at temperatures over 21° C, regardless of how much oxygen is present. A prolonged water temperature of 23° C or higher can eliminate the trout fishery.

Releases from the bottom of a reservoir, while cold, may be so deficient in DO that the fish immediately downstream cannot survive.

The trout population is, of course, limited by food supply. The production of trout food, primarily insects and invertebrates, is greatest in riffle areas where velocities range from 1.5 to 3.5 feet per second. Relatively shallow and flat riffle areas outside of the main channel are preferred by trout.

Turbid water lowers the feeding success of trout by reducing visibility. Reductions in flow may expose riffle areas and aquatic insects, and may increase the water temperature beyond the insects' proper range. Changes in temperature and DO may also disrupt the breeding, hatching, timing of maturation, and emergence of insects. For example, warm releases from reservoirs during the winter can prompt early emergence and high mortality of stoneflies, a major food for trout. Sedimentation can

cover sorted gravels, which should produce a high variety of insects. The removal of streamside vegetation may reduce the population of drift insects.

Trout seem to spend much of their time resting at a point that has sufficient cover and low velocity. Trout populations are decreased by a disruption in cover. Also, irregular fluctuations in flow can upset social hierarchies of trout by reshaping territories.

### Warmwater Fish

Popular warmwater species include small and largemouth bass, channel catfish, sauger, and sturgeon. As a rule, warmwater species can tolerate change better than salmonids or trout. Some warmwater species, such as catfish, seem to thrive in a stream with high TSS.

Decreased temperature of releases from deep reservoirs can damage warmwater fisheries in downstream reaches. Largemouth bass, for example, tolerate temperatures under 23° C, but cannot successfully spawn or feed in that circumstance.

Incubating bass eggs are sensitive to abnormal changes in temperature. Reduced flows can expose the spawning pits of nest-building species such as bass. High flows from peaking operations may scour spawning beds, cover them with silt, and force juvenile fish downstream.

Several warmwater species, such as channel catfish and spotted bass, migrate up and down streams to reach preferred spawning areas. Their passage may be obstructed by dams and by exposed areas caused by reduced flows.

### Riparian Vegetation

From the point of view of plants, a stream is an irrigation ditch. The stream also maintains a groundwater supply in surrounding land. So a stream establishes a distinct band of vegetation. Many species of birds,

mammals, and insects use this highly productive zone for feeding, shelter, and breeding.

Hydroelectric facilities can reduce the availability of water for a downstream stretch. In general, the more arid a region, the more drastic the impact on the riparian vegetation, which is dependent on this supply of water.

Resident animals would be affected by reduction in the average flow. Cover and shade would be decreased. Reduced flows can cause land bridges to be formed to downstream islands in large rivers, and waterfowl nests would then be subject to predation.

Flooding of land under a reservoir is the only impact which is certain to be negative. A standard estimate is that 30 acres are flooded for each megawatt of capacity.

### Conclusion

Every human activity changes the environment. America has set aside very few areas which are completely off limits for development. For example, the National Wild and Scenic Rivers System includes less than 1 mile out of every 600 miles in the country. Regulators strike a balance between preservation and uses which change the character of the stream, whether water supply, or mining, or hydroelectric development.

*It is possible to improve on nature: to make a stream even more suitable for human use and enjoyment, while maintaining its productivity. It is also possible to kill the golden goose.*

A stream is a balance of thousands of organisms, and many forces of chemistry and physics. More often than not, a human change in the environment will favor some organisms, and damage others.

The question is whether the development, on balance, does more good than harm; and that answer depends on what good we want—whether electricity, or a big fishery, or exciting whitewater.

Yes, I'd like to support the work of the West Virginia Highlands Conservancy and receive THE HIGHLANDS VOICE.

Name \_\_\_\_\_  
Organization you represent(if any) \_\_\_\_\_

Address \_\_\_\_\_  
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Please accept my membership in the category I've checked.

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| ___ \$30 Associate                        | ___ \$200 Sustaining |
| ___ \$50 Sustaining                       |                      |
| ___ \$12 Senior citizen/Full-time student |                      |

- I'd like to volunteer, please contact me.
- I can't volunteer at this time, but want to support the work of WVHC with my membership contribution.

Make checks payable to: West Virginia Highlands Conservancy  
Mail to: Suite 201, 1206 Virginia Street East, Charleston, WV 25301  
(304) 344-8833



# Could Be—Coal Slurry Defeated—For Now

By Linda Winter

On December 11, 1984, the Special Joint Committee of the Maryland State Assembly voted 5-3 against recommending the coal slurry pipeline proposed to run from West Virginia to the Chesapeake Bay. The special committee was formed this past summer to study the possibility of a coal slurry pipeline. (See related article in the November issue of the Voice.)

The vote was originally scheduled to take place on November 27, but delaying tactics were used by proponents of the project. The motion to

recommend the pipeline was made by State Delegate Curran (Baltimore City), co-chair of the committee.

Senator Dorman (Prince Georges County), also co-chair, voted against the recommendation. Votes of the other committee members follow: Senator Cushwa (Hagerstown)—against; Senator Bonvegna (Baltimore City)—against; Senator Clark, Jr. (Belacott City)—for; Delegate Gary (Ann Arundel County)—for; Delegate Kolodziejki (Ann Arundel County)—against; Delegate Finan (Cumberland)—against.

It's interesting to note that Senator Cushwa and Delegate Finan, from the western part of the state where the project was supposed to have the most benefit, voted against the project.

But we haven't heard the last of the pipeline. Chuck Fox, Director of the

Chesapeake Bay Project for the Environmental Policy Institute, said, "We have won yet another battle, but we have not won the war. Every indication is that the bill will be introduced in the next session despite the committee's unfavorable recommendation."

(Continued from Page 1)

## WVHC Opposes ...

and Little Coal Rivers. Neither river presently meets state water quality standards at or near their normal flows of 30-35 cfs. The Guyandotte already ranks among the state's worst in water pollution problems. Both rivers are the source of numerous municipal and private domestic and industrial water supplies.

George told the Joint Committee the WVHC would oppose any export of West Virginia's water until the state adopts a water use management program to inventory both water supplies and local consumption and to protect in-state water users. George also told the Committee that the WVHC would pursue whatever judicial, legislative or administrative relief necessary to bar the export of state water until such a program is established.

The West Virginia Legislature granted all coal slurry pipeline projects the right of eminent domain in 1962, but has never adopted a water use management program. Therefore, BG&E requires no official West Virginia authorization to build the pipeline. However, the Maryland General Assembly must specifically authorize pipeline construction which is then regulated by both Maryland's existing water use management program and Public Utility Commission.

George concluded, "It is both ironic and unfortunate that West Virginians must plead for protection of their state's water before the Maryland General Assembly, particularly when Maryland has the most to gain by taking it. It is imperative that West Virginia act decisively to protect its water by promptly establishing a state water use management program."

## Coal Refuse Cleanup—

### Who Pays?

The West Virginia Department of Natural Resources is moving to get 24 coal refuse dams, most of them in southern West Virginia, reclaimed before any of them break. Located in valleys, these dams have the potential to impound or retard the flow of water.

"Some do impound water," says Brian Long, head of the dam control section of the DNR reclamation division, "but most are so porous the water seeps through."

The danger of coal refuse dams came clear in the 1972 Buffalo Creek disaster, when a Pittston slate dump collapsed during heavy rains, killing 125 people.

The question of who pays for the cleanup may depend on the outcome of a case brought by Eastern Associated Coal Corp., which owns a dam located in Kopperston. Eastern contends it's not responsible. The 1980 Surface Coal Mining and Reclamation Act requires companies to clean up where active mining has occurred since August 1977. Inactive areas are cleaned up by the Abandon-

ed Mine Land fund. The Kopperston refuse dam is in question because although the dump has not been used in some time, Eastern is currently mining nearby. DNR considers it an active site.

After DNR asked Eastern to reclaim the dam and develop emergency monitoring and warning plans, Eastern went to court. On April 12, Kanawha County Circuit Judge Andrew MacQueen ordered the company to comply. In early September, the company requested and received a stay of MacQueen's order.

Since then, DNR has given notice to companies responsible for the other 23 dams, requiring them to develop monitoring and evacuation plans by November 30.

"Some have said the notice was sent to the wrong people, that they don't own the land. Some have offered no response, and some have come across with plans," Long said.

Eastern has until February to appeal MacQueen's original order to the State Supreme Court.

(Continued from Page 1)

the actual amount was never more than 0.6 lbs/hr.

Sikorski reacted to the discrepancy, "It's one thing for the federal and state government not to know; it's one thing for the people not to know; but it's another thing for the company not to know."

"We rely on you to regulate yourself and you don't know what's happening," he said.

Committee members seemed deeply disturbed by some of the testimony. Rep. Florio expressed doubt that regulatory agencies could be trusted to get the job done. "I wish I could say I had more confidence," he said. "If reasoned regulatory acts cannot be made to work, we must look for alternatives." He mentioned more citizen access to courts and oversight through the insurance industry as possible alternatives if regulation fails.

The committee indicated it will keep the record of its hearing open to allow for submission of written comment. WVHC will submit comments in the next few weeks.

## Still Time to Register

### for Winter Fun

Things are firming up, and reservations coming in for the WVHC Winter Meeting to be held at the Alpine Springs Motel at Bowden on January 19th and 20th.

Outings Committee Chair John Purbough has packed the trail for the cross-country nuts among us (see accompanying article), and moved the start-up time on skiing to 9:30 a.m. If you can't make it by then, come anyway. You can still ski.

Remember, you must make arrangements through the WVHC offices for group meals (Saturday dinner through Sunday lunch) and for Saturday night lodging if you want to stay at Alpine Springs. If you come Friday night, you must make your own arrangements directly. The rooms are

expected to fill quickly, so send your check today. Use the registration form in this issue. Priority is first come—first served basis for lodging, based on when your check arrives.

As always, we can only refund your money if someone takes your place and we meet the costs of the weekend.

The Saturday night program will include some enlightenment (on the subject of Corridor H and the Monongahela National Forest Plan) and some socializing, as usual. We can't get together without having some fun.

The Board Meeting starts Sunday at 9:00 a.m. and adjourns when the business is finished.

Don't wait another minute—sign up today!

## Disaster Spotlights ...

vocated the passage of right-to-know legislation. Presently only plant workers in West Virginia have the right to be informed of the hazardous chemicals in their midst.

Congressman Florio strongly questioned the apparently good intentions expressed by Carbide's President Anderson regarding support for the public's right to know and tighter regulations on the industry. "I am astounded when I hear that, when the chemical industry killed federal regulations on the right to know."

"The chemical industry killed hazardous substances legislation," he added, and "opposed storage and transportation regulations."

Congressman Gerry Sikorski quoted a 1981 report to the Air Pollution Control Commission in which Union Carbide listed its routine emissions of chemicals. The list revealed emissions of chlorine and benzene at the rate of 22 pounds per hour, formaldehyde at 86 lbs/hr, phosgene (nerve gas) at 1.77 lbs/hr and MIC at 12 lbs/hr. After the disaster, Sikorski said, Carbide claimed a bookkeeping error in the amount of MIC and said

## Winter Meeting

### Reservations

I'm Coming—Sign me up for:

Sat. lodging at \$11\_\_

Sat. dinner at \$7\_\_

Sun. breakfast at \$4\_\_

Sun. lunch at \$5\_\_

Total Enclosed\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

Please specify any special arrangements for rooms (sgl., dbl., share with)

Mail to WVHC, Suite 201, 1206 Virginia St. East, Charleston, WV 25301.



# Way Opened to Buy Otter Creek Minerals

The Forest Service, USDA, has determined that a plan to develop mineral resources in the Otter Creek Wilderness is not compatible with wilderness management.

The Otter Creek Wilderness, located near Elkins, West Virginia, in the Monongahela National Forest is a 20,000 acre wilderness designated by Congress in 1975.

The Otter Creek Coal Company has prepared a plan to mine coal and develop oil and gas on its 18,535 acres of mineral holdings, nearly all of which lie under the Otter Creek Wilderness. The plan identifies 10 coal mines, 58 deep gas wells, and 247 shallow gas wells. Over 45 miles of road and coal preparation plant would be needed to support the development. The project is expected to last 30 years. According to Ralph F. Mumme, Forest Supervisor of the Monongahela National Forest, the Forest Service is required by the wilderness law to determine if developments such as this would be compatible with the congressional intent of wilderness management.

A comparison of the proposed mineral development plan with the

wilderness features of the area revealed that the two uses are not compatible.

According to Public Law 93-622, private rights can be acquired by the U.S. Government with eminent domain (condemnation) procedures only if the proposed use is not compatible with management as wilderness.

Supervisor Mumme stressed that this determination alone does not prevent the company from proceeding with their plans or make any judgements about the merits of the proposed plan. Further, it does not affect the granting of any needed permits. It is one of the first of several steps the Forest Service must follow in determining the appropriate response to the company's proposal. Since this finding removes the statutory limitation on the use of condemnation in the wilderness, it also increases the range of responses to the proposal.

The question of Otter Creek's valid existing rights is subject to pending judicial and administrative review. The company's ability to mine will be affected by the outcome of these cases.

## Coming Up

### WVHC Winter Board Meeting & Ski Outing

—January 19-20—Alpine Springs Motel, Bowden  
—Saturday ski trip at White Grass Ski Touring Center in Canaan Valley, evening program on Corridor H and MNF plan. Sunday meeting. (See this issue for details)

### Sutton Audubon Potluck & Slide Show

—January 15, 6:30 p.m.—BBC Clubroom, 707 Warwood Ave., Warwood  
—Slide program on "Arizona Birding"  
—Bring silverware, dishes & something to share

### BBC Early Spring Meeting

—March 1-3—Jackson's Mill  
—Write BBC, Rt. 1 Box 116, Triadelphia WV 26059 for information

## National Forest Cites Successes

Elkins, WV—Forest Supervisor Ralph Mumme has announced accomplishments in the area of wildlife and fisheries habitat management on the Monongahela National Forest for the Fiscal Year 1984, which ended on September 30.

Habitat improvements over the past year include 2,359 acres and 249 structures for wildlife, 18 fish habitat improvement structures, and 32 acres of planting for streamside shade. Summit Lake, a 41 acre impoundment, was limed prior to stocking with trout.

The 852,000 acres of the Monongahela National Forest are home to 374 breeding species of wildlife and almost 1,500 species and varieties of vascular plants, which is over 44% of the total number vascular plants known in the state. There are 576 miles of trout and 131 miles of warm water fishable streams on or adjacent to national forest land.

Three mammal species in the forest are classified as Endangered: the Virginia Big-eared bat, the Indiana bat, and the Eastern cougar. Two caves have been gated to protect the bats. Efforts are underway to try to confirm the presence of the cougar.

The West Virginia Department of Natural Resources and the Forest

Service cooperate closely in management of Forest resources. One or more state biologists sit in on most Interdisciplinary Team meetings (up to twice a month), to review projects planned on the forest. State biologists provided considerable and valuable data for preparation of the Draft Land and Resources Management Plan which will be released for public review and comment shortly.

The WVDNR has divided the Forest into 10 wildlife management units. Each unit has a full time Wildlife Manager who coordinates closely with the District Ranger. These Managers completed habitat improvements amounting to 1,921 acres and 161 structures. Many other cooperative efforts were accomplished with the Forest providing lime, fertilizer, seeds, and some labor; the Managers provided farm equipment, tractors, seeders, etc., to complete the job.

The Monongahela National Forest has developed a computer storage system of wildlife and fish habitat maintenance needs of structures, developments, and facilities. Maintenance needs of the state DNR developments are also included. This program will soon be implemented throughout the Forest.

### WV LEGISLATURE — 1985

January 14—First Day for Prefiling Bills

February 13—Legislature Convenes

April 13—Last Day of Regular Session

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Hiking Guide to Monongahela National Forest and Vicinity, WVHC

Invaluable for hikers—includes trail descriptions, topo maps. 240 pages, with Dolly Sods, Otter Creek and Cranberry. \_\_\_\_\_@ \$7.00 paper (ppd.)

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Order your copies of important wildlife and conservation books from the WVHC. Send your check or money order and this order blank to: West Virginia Highlands Conservancy, Suite 201, 1206 Virginia Street, East, Charleston WV 25301. Allow 3-4 weeks for delivery.

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West Virginia Congressman Bob Wise joined the committee for hearings on the matter most affecting his district.



State Senator Tod Kaufman (left) and WV-CAG Environmental Coordinator Perry Bryant testified with five other community representatives during the Waxman hearings.



# X-C Canaan at Winter Meeting

On Saturday, January 19 the Conservancy will visit White Grass Ski Touring Center in Canaan Valley as part of winter meeting activities. (Details about lodging and program are elsewhere in the Voice.) Both novices and accomplished cross country skiers can be accommodated. Rentals, group lessons, an extensive trail network, and special events are all available.

White Grass is special place, both because it's in Canaan and because its owners are supporters of efforts to protect the Valley.

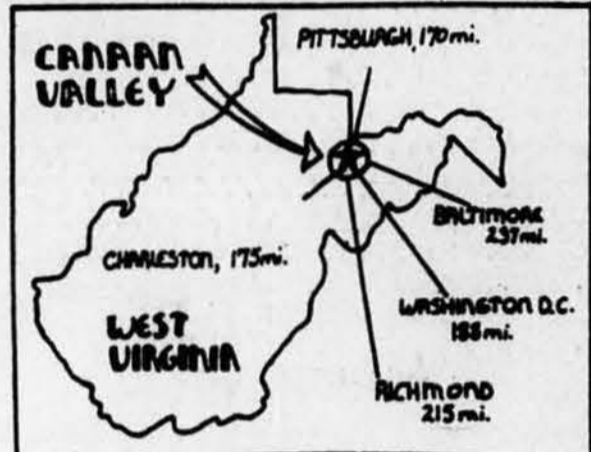
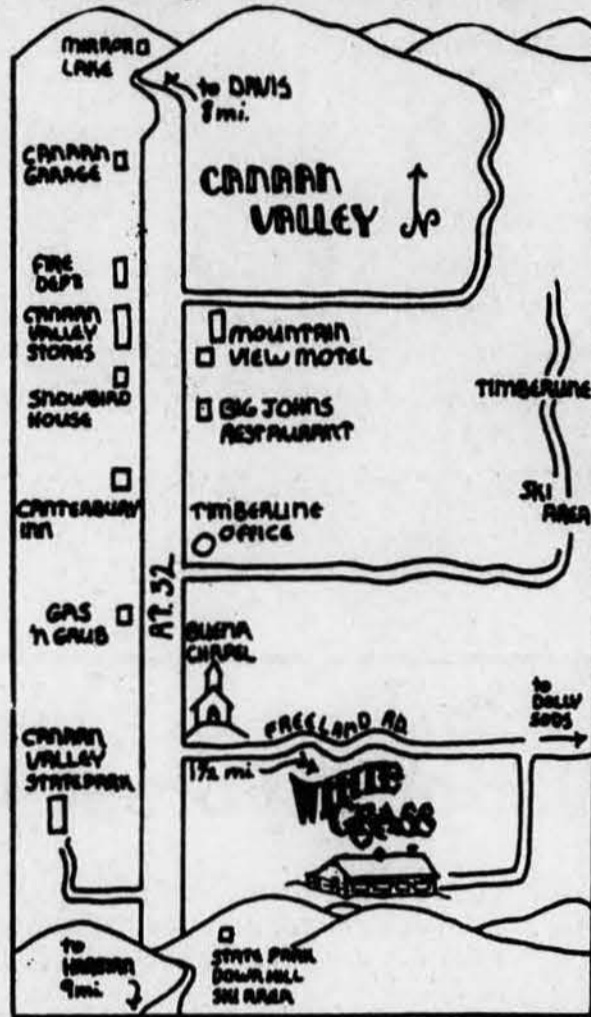
Flexibility will be the order of the day on Saturday. Persons wishing to rent skis there (\$8) should call (304) 866-4114 or write White Grass Ski Touring Center, Rt. 1, Box 37, Davis 26260. Renters should plan to arrive for fittings before 9:30 a.m. Saturday. Group lessons are available at 10 a.m. and 1:30 p.m. Area use is free with a lesson, or \$4 for the day.

An extensive trail network offers opportunities for skiers of all levels. If enough interest is expressed, a day tour for advanced beginner to intermediate skiers to Dolly Sods can be arranged. Featured that weekend at White Grass is the North American Telemark Organization (N.A.T.O.) training clinic and festival. Sandwiches and soup are available in a cafe at the Lodge.

Plan to meet at White Grass at or before 9:30 a.m. if you wish to ski in small groups or try the Sods tour. Novices should plan to participate in one of the group lessons. Remember to dress sensibly, in layers, starting with an underlayer (polypropylene is good since it doesn't absorb moisture), followed by a loose fitting

main layer and an outer shell or sweater.

Call Outings Chair John Purbaugh with your questions. See you there!



# Forest Service Releases Draft Plan for MNF

Representatives of the West Virginia Highlands Conservancy, Trout Unlimited, and The Nature Conservancy braved the first winter storm in the Charleston area to hear Monongahela National Forest officials describe the draft of a 10-year plan for the Forest. The plan is available for public comment between now and March 29, 1984.

Forest Supervisor Ralph Mumme and Gil Churchill explained the plan and distributed copies to group representatives. Dr. Willis Hertig, Director of the West Virginia Department of Natural Resources also attended.

According to Churchill, Forest officials identified a number of management problems and concerns relating to the MNF as early as 1979-80, when preliminary work on the plan began. Among these were mineral exploration and development, transportation, vegetative manipulation, management of open areas, and National Recreation Area management. He said the plan attempted to address each of these concerns in a balanced way.

The other side of the plan, Churchill explained, is the ecological study. Using a computer modeling tool called FORPLAN, foresters "modeled" the entire forest. "We learned several things," Churchill said. "We learned we easily have the resources to meet demands." While the Forest presently provides 40 million board feet per year and projected demand is for 175 million board feet, the Forest

could provide 250 million board feet per year, he explained.

"We also learned it was cost efficient to manage the Forest," Churchill said. According to their studies, even-age silviculture (by implication, clearcutting) is preferred, and a longer cycle of cuts is preferred over a short cycle.

Dr. Hertig noted the even-age culture of trees was better "from an economic standpoint, but not necessarily for wildlife management."

Addressing the issue of roads in the forest, Churchill indicated the new plan represented a shift in direction from previous practices. According to Ralph Mumme, "The intent is to keep the standard down, the impact down, and the cost down." (In FS terms, a low standard refers to a road developed only for intermittent use, without extensive surfacing or other construction.)

"We have only about 25% of the transportation system in effect," Churchill explained, with many of the extensions planned to be short spurs for maintenance, timbering or mining.

Maps on file in each Ranger District office and in Elkins show all proposed roads, timber sales, and other development activities encompassed by the draft plan. Only the Elkins office has maps for all districts.

### NRA Focus Shifts

The emphasis for the National Recreation Areas is changing to deemphasize developed recreation and emphasize primitive recreation, Churchill said. The Forest Service will also back off of land acquisition plans. A former plan to buy 16,000 acres surrounding the NRA has been scrapped and a 7,000-acre acquisition program substituted. In addition, the Forest may acquire lands under willing buyer/willing selling conditions.

### Alternatives

In developing the 10-year plan, officials developed five basic alternatives representing different emphases. According to Churchill, each alternative is workable and each addresses the issues relating to forest management. He characterized the alternatives as follows:

- A—Current management, an attempt to model what has been done;
- B—Emphasis on wildlife and dispersed recreation;
- C—Emphasis on uneven-aged silviculture;
- D—Emphasis on market products; and
- E—Emphasis on balancing various interests.

The final plan recommended for adoption is Alternative E, and the full study, detailed specifications regarding sales, use, roads, and management techniques, and maps were developed around that alternative.

Forest Service officials will explain the MNF plan to West Virginia Highlands Conservancy members on Saturday evening, January 12, at the Winter Board Meeting to be held at the Alpine Springs Motel at Bowden.

A future issue of the Voice will carry more detailed information about the plan.

## Ski Rentals

White Grass Ski Touring Center  
Rt. 1 Box 37  
Davis WV 26260  
(304) 866-4114

Trans Montane Outfitters  
P.O. Box 325  
Davis WV 26260  
(304) 259-5117

Blackwater Nordic Learning Center  
Blackwater Falls State Park  
Davis WV 26260  
(304) 259-5216

