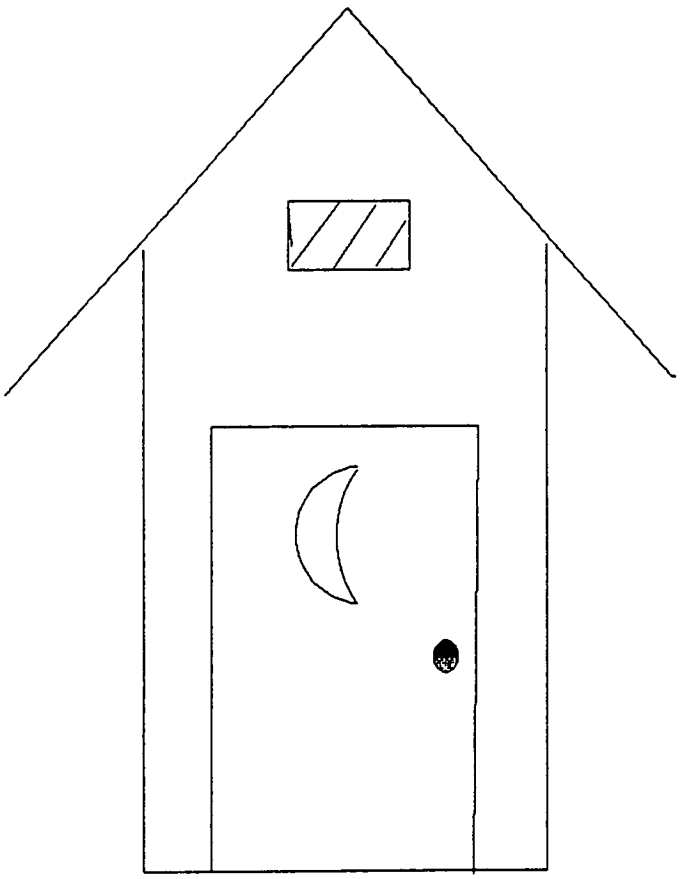
Mount Rainier National Park
Backcountry Toilet Technology Workshop



March 30-31, 1993

Summary of Backcountry Waste Technology Workshop
Mount Rainier National Park
March 30-31, 1993

On March 30, 1993 participants from Alaska, Oregon, Idaho, Montana, Colorado, Utah, California, and Washington were welcomed by Superintendent William Briggle, who challenged us to use this meeting as the first step of a strategic plan. He asked us to consider the problem as part of the Vail Agenda, to serve the public while protecting the resources. After orientation, the 51 participants all introduced themselves and had the opportunity to give presentations on their questions, problems, and experiences. Presentations ranged from a few sentences to well-prepared reports with slide shows. Groups represented were rangers, maintenance workers, resource managers, manufacturers, designers, public health professionals, researchers, and administrators. A list of participants is attached. Also on March 30 we had presentations from Romtec toilets, Advanced Composting Systems (Phoenix), Clivus Multrum, and OSU researcher Pete Nelson, who has studied pit toilets at Mt. Rainier.

Most of the topics discussed on the first day were repeated on the second day, when six panel discussions gave us the opportunity to look into the finer points.

PANEL: RESOURCE AND HEALTH CONSIDERATIONS

The topic of the first panel, chaired by Ruth Scott of Olympic NP was "Resource and Health Considerations". Ruth reviewed regulations relating to environmental protection. We discussed tradeoffs between 1) size of structures in backcountry or wilderness, 2) hazards and intrusion of helicopters, and 3) limiting access to an area. It was obvious that different agencies and parks have approached these options differently. One statement was a plea not to tie our hands with "minimum tool" demands when technology can solve the waste problem. Another suggestion was to consider total pack-out, since human waste was generally agreed to be the most serious impact on the backcountry.

As part of the first panel John Collins and Phil Pollard, of the USPHS, talked about health concerns of workers. They gave us the somewhat surprising news that neither the USPHS, the NPS, OSHA, or the new blood born pathogens rule have ever recommended hepatitis immunizations for workers who handle human waste. The only needed shot is for tetanus, which everyone should have anyway. Emphasis should be on protective barriers of gloves, coveralls, boots, etc. We talked about the possibility of being able to apply composted material in the backcountry, and no one was confident enough in their composting system to recommend this, at least in public. The USPHS is in the process of adding to NPS-83 guidelines recommendations about waste treatment, including review of pit siting by sanitarians. Also discussed was the longevity of pathogens (long).

PANEL: PITS AND VAULTS

Bill Makel of USFS, San Dimas, was the chair of this panel, which included Cliff McDonald, Jeff Harker, and John Warder. Bill has the position that used to belong to Briar Cook, the "guru" of vault toilet design. Bill gave a review of Sweet Smelling Toilet (SST) fundamentals, many of which apply to venting of any waterless toilet. Vault toilets have some applicability to backcountry locations, such as when a road is closed to the public but open for administrative use. He also made everyone aware of the research that has been done on odor masking chemicals, finding that none of them work. Another point made was that efforts to hide toilets from sight are counterproductive, since exposure to wind and sun are necessary to remove odors from the area.

PANEL: COMPOSTING

This panel was chaired by Korwin Kirk of Yosemite, and included Lisa Ensworth, Kelly Bush, Al Palisca, and Chris English. Lisa and Al had different opinions of commercial composters, with Lisa reporting no problems with high usage figures, and Al stating that 10,000 uses per year will overload a Phoenix toilet. All composters in Yosemite are now overloaded by at least three times, and their Backcountry Utilities Division is designing and building larger scale composters than what is available commercially. They are anxious to see how well their design works out next season. North Cascades NP has had over ten years experience working with small composting units, and they are pleased with their current model of toilet with attached bin. All panelists agree that regular maintenance and appropriate sizing of units are keys to good operation. A rough classification of increasing capacities is 1) Sun-Mar, 2) North Cascades, 3) Phoenix and Clivus, and 4) Yosemite.

Testimony was made that interpretive programs were successful in reducing trash and other misuse of backcountry toilets. Briar Cook's retirement activity was discussed, he's designing and manufacturing a tool for stirring compost.

PANEL: DEHYDRATION

Joe Arnold of Rocky Mountain NP led Dick Halverson, Scott Ruesch, and Chris English in a discussion of dehydrating toilets. Rocky Mountain NP and Mt. Rainier NP both started working with dehydration in 1983 and have finally reached confidence with their toilets, after lots of headaches. Operation in both cases has evolved toward simplifying both components and necessary adjustments. Scott talked about dissatisfaction with the operation of Shasta toilets, and others expressed bafflement that they are still being marketed. Chris talked about closing the loop and the fact that landfills are increasingly less likely to accept human waste.

PANEL: FLY- AND CARRY-OUT

This panel was led by LuVerne Grussing of BLM and included John Warder, Dan Verrall, and Mike Carney. They talked about the user's responsibility to the resource and the recent development of the philosophy that users should pack their own waste out. Dan, Mike and John gave reports on their use of helicopters. LuVerne is the chair of the interagency task force on backcountry human waste disposal which has been little known up until now. The task force has worked primarily with river travel up to this point.

PANEL: FUTURE PLANS

John Collins of the USPHS was the chair of this panel, which included Phil Ayers, Trevor Jones, Elwood Lynn, and Phil Pollard. We held a free-wheeling discussion on how to keep the momentum that had been generated by the workshop, with many people eager to get together again in the near future. Bill Makel committed to push the USFS to write a book of guidelines, similar to other manuals they have written for frontcountry toilets. John Collins will lobby the NPS to do a follow up to the RAMWAD study. LuVerne will plan to produce a newsletter that will keep us up to date on future developments. Yosemite NP invited us to meet again in October 1994 at Yosemite. With the help of facilitator Gail Purifoy we brainstormed and then ranked a list of issues to consider in the future, and also what we feel are our communication needs. The results of the ranking is attached - please note the groupings section, which is more relevant than the first set of priorities. The group was very strong in desiring the guidelines book, although there was general agreement that toilet sites are all different and final decisions belong with area managers.

I'd like to thank everyone who participated for the interest, energy, experience, and commitment they brought to the workshop. I'd like to pass on a couple newsletter-type items. We should have discussed "biodegradable" plastic as an alternative. It would help our carry-out program if there really was some, but we haven't found it yet. We submerged a bag made from corn starch in an aerobic sewage digester for six weeks. At the end of that time only the lettering was slightly faded. Also, this week I talked to an engineer who is working on a solar incinerator for toilet waste. Maybe the ultimate answer! He said his company is on the "bleeding edge", but seemed confident they could make it work. Thanks again,

Roger Drake 4/15/93

Trevor Jones
Chairman of Alpine Club of Canada's
Water, Energy & Waste Management Committee,
Alpine Huts (backcountry cabins)
939 Thorneycroft Drive NW
Calgary, AB, T2K 3K6

Interest in this matter is centered around the idea that the ACC, as Canada's National mountaineering body, has a moral obligation to be environmentally friendly to the mountain area in which we have our alpine huts. In addition, all of our huts, but one, are in the national parks, so our operations are subject to federal regulations which stress environmental accountability.
Our intent is to instigate the usage of the best available functioning technology (BAFT) for backcountry toilets.

Mal Talbot
25 Cornell Road NW
Calgary, Alberta, Canada
403-282-4760

Chairman of Operations Committee for huts and backcountry cabins for the Alpine Club of Canada, with responsibilities for upgrading and renovations of 18 facilities ranging from six-man climbers bivouac huts to 35-40 person log cabins below tree line. All but three of these facilities operate twelve months 'round with several huts high season for ski mountaineering. These huts are spread across the Rocky Mountains and the Selkirks to the west, in four different national parks - Banff, Jasper, Yoho and Glacier, and one British /Columbia provincial park. We are attempting to improve all our toilet arrangements to reduce maintenance, helicopter use and costs.

Steve Evack
Architectural Design Technologist
Public Works Canada
E&As (Engineering & Architectural Services)
Dedicated Unit to Canadian Parks Services
Room 530 - 220 4th Avenue SE
Calgary, Alberta T2P 3H8
403-292-4727
403-292-4886 (Fax)

I work at the Western Regional Office of Canadian Parks Services, in Calgary, Alberta. From this office we provide engineering and architectural services to all national parks in Alberta and British Columbia, including Banff, Jasper, Yoho, Revelstoke, Glacier, Waterton, Kootenay and Pacific Rim.

My work is primarily small building design, including all types of toilet buildings. Since 1975 I've worked on systems from standard flush to vacuum toilet systems. More recently I've been involved

with applying S.S.T. technology to vault privies. Success in this and some Phoenix composting applications has brought requests for guidance for more unique backcountry solutions.
I came to this workshop to get a current reading of:

1. The problems as viewed in the field.
2. Possible applied solutions.
3. Honest appraisals of limitations of current practice.
4. Current "state of the art" - starting point for finding solutions.
5. Criterion for assessing proposed solutions.

Mary Coleman
Waterton Lakes National Park
Warden Service
Waterton Park, AB
CANADA TOK 2MO
(e-mail in Canada - ColemanM at Al at PKSWL)

Waterton park utilizes pit toilets to handle backcountry human waste. In some areas the pits see high summer use (over 100 uses per day) and the toilets must be re-located annually (creating high maintenance needs). New location sites are difficult to find and bedrock makes alternate pit sites hard to locate.
Some outhouses wind up being located fairly close to water, indicating a more self-contained system would be desirable.
Other problems with pit toilets include garbage being deposited in the pits and odor.
I am here to obtain information on alternate outhouse systems. Waterton Park needs something which can accommodate fairly high use, can withstand wide temperature fluctuations, needs low maintenance, and eliminates (or reduces) the amount of solid waste ultimately deposited on site.
Hopefully this workshop will uncover some solutions.

Joe Arnold
Park Engineer
Rocky Mountain National Park
Estes Park, Colorado 80517
303-586-3565, ext. 234

Rocky Mountain National Park has operated a successful backcountry dehydrating toilet system on Longs Peak at elevations up to 12,700 feet since 1983. A 22 page report is available which details theory of operation, and maintenance considerations, and which contains recommendations and plans for other areas considering dehydration as an option.
We also have a good vault toilet design which meets S.S.T. requirements and is architecturally attractive. Plans are available for this.
Additional information can be obtained from me at the above address.

Dave Karaszewski
Chief of Maintenance
Zion National Park
Utah 84767
801-772-3256, ext. 28

May be installing composting and vaults over the next couple of years.
Experience with heavy visitation; plans for transportation system, and overall development concept plan geared to reducing congestion.
Looking for any tips on dealing with all of the above.

LuVerne Grussing
Bureau of Land Management
Route 3, Box 181
Cottonwood, Idaho 83522
208-962-3245
208-962-3275 (FAX)
IDLGRUSSING (e-mail)

Primary concerns/area of knowledge:
Waste management along rivers, especially carry-out systems.
Worked on the development of new, user-friendly carry-out systems and the development of disposal systems at take-out points and end of trips.
Chairperson of interagency task force on human waste management.

Phil Ayers
Environmental Engineer
Division of Construction and Maintenance
Rocky Mountain Regional Office
National Park Service RMR-ME
P.O. Box 25287
Denver, Colorado 80225

As an environmental engineer in the Rocky Mountain Regional Office, I provide technical support recommendations, advice and designs for water supply and sewage treatment and disposal systems for parks within the region. These parks represent a great variety of climatological and geographical conditions, as well as a variety of visitor use patterns. I am attending this workshop to find out more about the types of human waste disposal methods that have been utilized in backcountry environments, and to discover some of the advantages and disadvantages of these various approaches. I am also developing a list of people to call for more specific operational information for these various systems.

Jeffrey P. Harker
Glacier National Park
West Glacier, Montana 59936
406-888-5441, etc. 289

To stay abreast of latest changes in waste management as well as share my ideas and experiences with others.
I work with a five million gallon lagoon system all the way down to pit toilets and composting toilets.

Jack Potter
Assistant Chief Ranger, Field Resources
Glacier National Park
West Glacier, Montana 59936
406-888-5441

Toilets
Human waste facilities associated with designated campgrounds, high use destinations and administrative facilities. Mostly pit and wallowa toilets. One Clivus and two septic systems (now closed) at backcountry chalets, six and one-half and four miles from roads.

Info
Alternatives to pit toilets, how applicable to our situation, siting criteria.
Structure placement philosophy/wilderness ethic.
Solutions to odor problems.
Smaller scale composting.

Why
Learn about current technology, what other parks are doing.

John Collins P.E.
Environmental Sanitation Consultant
U.S.P.H.S./NPS/RMR
P.O. Box 25287
Denver, Colorado 80225
303-969-2920

I am a commissioned officer in the U.S. Public Health Service, assigned by the PHS Centers to Disease Control in Atlanta, Georgia to the Rocky Mountain Region of the National Park Service. My background and training is as an environmental engineer in water, wastewater, solid waste, and food service.
I act as an in-house consultant to the NPS to prevent outbreaks of illness and protect the health of NPS employees and visitors. I and four of my counterparts from other NPS regions are writing a wastewater policy for the NPS that addresses backcountry and frontcountry wastewater systems, and human waste disposal issues. My purpose in attending this conference is to learn of new and developing technology and methods for safe handling of human waste in backcountry areas.

Phillip E. Pollard
National Park Service
83 South King Street
Suite 212
Seattle, Washington 98104
206-553-1006

U.S. Public Health Service assignee to the NPS as an Environmental Sanitation Consultant. Provide all types of public health consultation, particularly assuring that water supplies, waste disposal systems and food services are safe for public use. Service area includes all national parks in Alaska, Washington, Oregon and Idaho.

Richard Engle
Pacific Northwest Regional Office
83 South King Street
Suite 212
Seattle, Washington 98104
206-553-1006
(on e-mail listing for Regional office)

I want an update on waste management systems.
I have worked with SSTs.
Would like to see continued follow-up on actual experience of various systems in various environments and use levels.

Barbara Richey
Wilderness Program
Mount Baker Ranger Station
2105 Highway 20
Sedro Woolley, Washington 98284
206-856-5700
B.Richey ROGFO5DIA (e-mail)

Presently using pit toilets in the Wilderness areas. On the Mount Baker National Recreation Area, we are using the North Cascades National Park direct deposit toilet.
Want to keep up on the "transfer" of technologies, on what other agencies and districts are doing to solve sanitation problems.
The area that I am interested in seeking more information on is sanitation on glacius-climbing routes, glacier camps.

Scott Ruesch
Chief Park Maintenance
Sequoia and Kings Canyon National Parks
210 Windsor Court
Exeter, California 93221
209-565-3140

I have worked with waste management on and off for 25 years. I have had experience with burning waste (i.e. adding diesel fuel), pit toilets, vaults, three composting systems and 55 gallon drums, and flying waste out of the backcountry.

Bill Makel
U.S. Forest Service
Technology and Development Center
444 East Bonita Avenue
San Dimas, California 91740
909-599-1267

I'm here because SDTDC is interested in current state of handling human waste in remote areas and identifying needs to potential center projects. I'm very familiar with toilet venting (SST) to eliminate or reduce toilet compartment odors. Also I want everyone to be aware of work being done at San Dimas and Missoula Technology Development Centers and the availability of published reports. Contact met to get on mailing lists or to receive specific reports. I want to continue to be in the information loop for future developments.

Alan Palisca
Backcountry Utilities Work Leader
Yosemite National Park
P.O. Box 577
Yosemite, California 95389
209-372-0550
YOSE Al PALISCA (e-mail)

I work with composting toilets - Phoenix, Clivus, Sun-Mar and the Yosemite version. Additionally, Yosemite has pit and flush toilets with a conventional septic tank/leach fields.
I am experienced in transportation of human waste (raw and composted) by pack animal.

Korwin Kirk
Backcountry Utilities Foreman
Backcountry Utilities Department
Yosemite National Park
P.O. Box 577
Yosemite, California 95389
209-372-05550
YOSE-KIRK, KORWIN (e-mail)

Objectives:

I am here to exchange ideas and information on backcountry waste management. I would like to learn how other parks are dealing with their problems.

Experience:

I have worked with Phoenix, Clivus, Sun-Mar, and Yosemite composting toilets. I am familiar with backcountry stock operations (horses and mules). I have knowledge of photovoltaic DC electrical systems related to backcountry water and waste systems.

Information I am Seeking:

A contact list.
Information on improvements and operation concerns with composters.

John Warder
Chief of Maintenance
Klondike Gold Rush NHP
P.O. Box 517
Skagway, Alaska 99840
907-983-2921

Klondike is adding a backcountry campsite and will be building two new toilets at the new site. In addition, one of our dozen or so remote toilets is routinely replaced each year. Many of these toilets are of the pit variety and do not comply with minimum separation distances from surface and ground water. I am looking for better solutions to old problems.
I have worked at Olympic National Park, with the trail crew, from 1968-1983, and since then at Klondike Gold Rush. I've worked with pit toilets, fly-out vaults, flush toilets, and the "Shasta waterless sanitation system".
I am still looking for a good system, though I may be able to combine elements learned here and elsewhere to come up with a solution which works best at Klondike.

Elwood Lynn
Chief of Maintenance
Crater Lake National Park
P.O. Box 7
Crater Lake, Oregon 97604
503-594-2211, ext. 200
LYNN, ELWOOD NP-CRLA (e-mail)

One Clivus Multrum, one Soltrans, and 14 portable toilets, along with backcountry pit toilets.
We are experimenting with retrofitting the Soltrans system with P.V. panels and fans in order to reduce odors and increase evaporation.
The Clivus system is used lightly and is working well.
Our biggest problem is the lack of maintenance. Short seasons and employee turnover has compounded the problem.

Mary Bean
Mt. Adams Ranger District
Gifford Pinchot National Forest
2455 Highway 14
Trout Lake, Washington 98650
509-395-2501
RO6FO3DO3A (e-mail)

Work with two wildernesses - one a high-use climbing/overnight area.
Currently no sanitation facilities used.
I am particularly interested in learning about what might be appropriate facility for 9,000-10,000 foot elevation, climbing route with high (12,000+) user days per year.

Gary Deibold
Gifford Pinchot National Forest
Packwood Ranger District
13068 US Highway 12
Packwood, Washington 98361
206-494-5515

My present position with Packwood Ranger District involves managing the District Recreation Program. This includes five developed campgrounds, two scenic rest areas, and 302 miles of trails - two-thirds of which are wilderness trails.
As a recreation manager, part of my responsibility is dealing with human waste. This session is providing many new ideas which will prove valuable in my future dealings with public sanitation.
Presently we utilize flush toilets and vault toilets in our developed campgrounds and scenic rest areas, an occasional pit toilet in non-wilderness backcountry, and the "cat-hole" philosophy in wilderness.

Randy Peterson
Outdoor Recreation Planner
Mount St. Helens National Volcanic Monument
42218 NE Yale Bridge Road
Amboy, Washington 98601
206-247-5473

Duties/Experience: Recreation facility, trails, and backcountry area planning.
Looking for inexpensive, low tech, low maintenance solutions for human waste management in a backcountry setting.

Lisa Ensworth
Operation and Maintenance Foreman
Mount St. Helens National Volcanic Monument
Gifford Pinchot National Forest
42218 NE Yale Bridge Road
Amboy, Washington 98601
206-247-5473

My position requires me to be responsible for operation and maintenance of all facilities located on the monument. This includes six vault facilities, one flush facility, twelve compost facilities - eleven of which are located in the front country; one which is located in the high country along the climbing route. Many trailheads and high use trails.
During winter months when most sites are inaccessible, I am responsible for coordinating winter recreation programs for the monument as well as coordination of the state-funded snowmobile grooming program.

Cliff McDonald
Fort Rock Ranger District
1230 NE 3rd Street
Bend, Oregon 97701
503-383-4707
C.McDonald:FOI DOI A(e-mail)

I work in the nation's newest monument, Newberry National Volcanic Monument, in the Deschutes National Forest. We have five developed campgrounds, four boat ramps, one horse camp and two hike-in camps. I came to this workshop to try and learn how we can improve what we have in the monument for our visitors.

Ruth Scott
Olympic National Park
Resource Management Specialist
600 East Park Avenue
Port Angeles, Washington 98362
OLYM, Scott, Ruth (e-mail)

Why here: To learn about alternative waste management systems that are being used in wilderness.

Have worked with pit toilets, fly-out vaults.

Seeking further information on toilet house structure designs appropriate for wilderness.
Composting/dehydrating systems - other successes/failures.
Criteria for pit toilet site selection (additional to what received).

Stephen N. Chaffee
Olympic National Park

I am responsible for managing backcountry operations in the Hoodsport Subdistrict.
Sanitation facilities in the backcountry include pit toilets for the most part. Vault toilets are also used. I am particularly interested in the safe placement of pit toilets so pathogens from fecal matter do not harm streams and lakes. I am also interested in the methods, techniques, and practices that will protect employees who handle fecal matter.

Chiggers Stokes
Soleduck Ranger Station
HC 62, Box 10
Port Angeles, Washington 98362
206-327-3534
206-928-3380
206-374-2444 (home)

I work as a backcountry ranger in the Soleduck area of Olympic National Park. This heavily used subalpine area evidences much human pact. Of the historic impact, much vegetative disturbance was created by backcountry pit toilets. Soleduck area is currently accommodating public sanitation with ten privies with fly-out 30 gallon vaults. Though we have made some innovations and improvements in this method over the years, there are still problems, and we would prefer a less labor-intensive, environmentally benign operation.

Bill Baccus
Resource Management
Olympic National Park
600 East Park Avenue
Port Angeles, Washington 98362
206-452-4501, ext. 285/286

Olympic Revegetation Crew.
As my job duty I participate in the monitoring and analyses of backcountry impacts, design of revegetation plans and development of Olympic Wilderness Management Plan. Each of these requires an understanding of backcountry sanitation and their related impacts. I have worked extensively with fly-out vaults (30 gallon), and pit privies. Cat-hole method (no available toilets) presently occurs in several of our high-use areas.
In the above situations, we are seeking a toilet system which can concentrate human waste without the expense of a fly-out system and which still fits into our wilderness policies.

Martha Hutchinson
Olympic National Park
Hoh Area Ranger
HC 80, Box 650
Forks, Washington 98331
206-374-6925
OLYM, HUTCHINSON, MARTHA (e-mail)

To examine options for managing human waste in the Alpine (year round snow/glacier) environment. To learn about alternative toilet technology for subalpine areas that are appropriate within wilderness designation.
Presently there are only privy/toilets being utilized for organized collection and disposal of human waste in backcountry/wilderness campgrounds within the high subdistrict of Olympic National Park. For the future, I would like a continued exchange of data on how systems are working or problems that are encountered.
I am especially interested in carry-out programs involving the community of climbers as the majority user/visitor group.

Don Mann
Trail Maintenance Worker
North Cascades National Park
Marblemount, Washington 98267
206-873-4596, ext. 25/35

Knowledge: Design, construction and evolution of North Cascades National Park composting bins. Also, I have many years experience in design and construction installation of pit toilets in the park ("wallowa" style).
Interest: Development and improvements in "low tech" backcountry moderate visitor use systems. Health and safety issues.

Human Waste Management in Wilderness
North Cascades National Park

North Cascades National Park has used a variety of methods to manage human waste for the prevention of sanitation, health and wilderness quality degradation. The use of a permit system with designated sites for camping along trail systems has concentrated backcountry camping and the accompanying waste management problems at certain high-use areas.
In low elevation forest camps, where layers of soil exist that are conducive for digging, "pit toilets" are used. A wooden toilet frame is placed over a pit 4-6 feet deep, and is filled when waste accumulates within two feet of the surface. Another pit is dug, and the toilet moved, preferably to a location nearby that disturbs the least amount of ground possible.
At high elevation sites, where soil is poor in organics and the ground not conducive for digging, either vault toilets, or more recently, the composting toilets are used. The vault toilets were 35 gallons in size and were removed by helicopter when full. This cost averaged $2,000 annually, was a difficult job, and then produced a problem of waste disposal at the ranger station.
The most recent and noteworthy toilet system in use currently in high-use subalpine camps is the composting toilet. Biological decomposition occurs as bacteria and fungi feed on organic material, reducing it to simpler components. While pathogens still exist in the resulting material, the volume is reduced enough that the toilets have been highly successful.
Design of the system has changed and evolved. Some are merely plywood and/or fiberglass bins, separate from the toilet, to which waste is transferred and "dumped". others are of "direct deposit" design, where waste accumulates in the bin itself. Both designs require regular maintenance to mix the waste with the composting medium to promote aeration and decomposition.
This composting or waste-reduction system is a successful, low-tech way to manage low to medium level volumes of backcountry waste. At North Cascades, this would be a toilet that accommodates an average of six to ten campers every night from late June through September. With regular maintenance, the volume of material in the bin will not increase.
Further information (maintenance tips, advantages, disadvantages, materials and construction information (is available in Composting Options for Wilderness Management of Human Waste (North Cascades document by Saul Weisberg), or from Wilderness District ranger staff (Kelly Bush, ext. 35) or Trails Maintenance staff (Don Mann, ext. 25) at 206-873-4590.

Robert Hewlett
Mount Rainier National Park
Star Route, Tahoma Woods
Ashford, Washington 98304
206-569-2211, ext. 3347
206-569-2359 (home)

I am here to see and help with projects that are being planned for the present and those in the future.
I am acquainted with systems in the park at Summerland, Camp Schurman, Camp Muir, and several pit toilets throughout the park. I am seeking follow-up on what has been proposed, and on future needs and demands of the people we serve,, and in keeping in contact with those folks I have met. Thank you!

Pam Griffin
Resource Management Specialist
Mount Rainier National Park
Tahoma Woods, Star Route,
Ashford, Washington 98328
206-569-2211, ext. 3376

I am attending the workshop to gain knowledge of backcountry waste management issues. I will be assuming the duties of Wilderness Coordinator for the park and as such, I will be working with the backcountry rangers on toilet placement issues.

Roger Drake
Utilities Work Leader
Mount Rainier National Park
Tahoma Woods, Star Route
Ashford, Washington 98304

I work with pit toilets at the 10,000 foot level on the mountain, solar dehydrating toilets, fly- and carry-out of collection barrels, chemical toilet fly-in at 7,500 feet, and I am beginning to work with the Phoenix composter.
I would like to build other dehydrating toilets and composters appropriate to site and usage.

Backcountry Sewage Disposal in Grand Teton National Park:

Grand Teton wanted to be included in our workshop. The following information is paraphrased by Roger Drake from a memo written by Scott Birkenfield and Mark Magnusson.

In addition to the use of pit toilets and cat-holes, Grand Teton has had experience with fly-out and dehydrating toilets.

Lower Saddle on the Grand Teton is a camping area used by about 40 climbers per night. Waste can easily contaminate the snowfield used for drinking water supply. About 1980 a bucket system was installed. Problems included scheduling flights whenever the bucket filled, difficult slingloading conditions, and slopovers. In 1987, the park switched to the solar dehydrator designed at Rocky Mountain National Park.

They thought the new system worked well except for two principal problems. The smell from the urine drying trays would sometimes overwhelm the camping area (this has also been experienced at Mount Rainier), and required maintenance was very difficult. Workers were put into close contact with waste when operating the toilet, causing some to refuse to do the work. When fans, pipes, or panels would break, more flights were required than with the bucket system, since this site is difficult to access on foot. Now they have returned to a bucket system using two buckets. Some of the loading problems have been solved, and they report the system is now popular with users.

Some of the themes that echo what others have reported at the workshop include: 1) Need for commitment to maintenance; 2) Difficulty in getting assistance from uncommitted users, e.g. concessioners and climbing guides; 3) Consideration of limiting access to an area because of toilet concerns; 4) Health concerns; 5) Separation of urine; and 6) Trying to limit helicopter time because of cost, safety and wilderness values.

Clivus Multrum, Inc. Composting Toilet Systems:

Over the past 50 years of conducting business, Clivus Multrum Inc.'s name has become synonymous with the concept of composting toilets and saving water. As such, Clivus Multrum, Inc., is a specialist in providing a complete, on-site human waste treatment system which stabilizes solid and liquid wastes into composts and liquid fertilizer, in a manner that is waterless and odorless.
Today, the technology has continued to evolve to include ten different public facility models, which provide a "full spectrum" of products for a variety of needs and usages.
The new product line now includes the high capacity 30s series which can be operated with either AC or DC electricity. The 3-s series design is radically different from the older models but the basic composting process remains the same. The largest system, the M-35, is capable of handling up to 65,000 uses per year. The 30s series utilize a controller processor for monitoring system use, fresh water and compost liquid pumps, fire suppression system and fan operations. It also maintains the compost moisture content.

Clivus continues to produce the basic 10s series of composters for a wide range of remote sites from low to heavy use with shock loading capabilities. The M-12 low profile tank is only 60 inches tall so fits well in situations where site conditions are limiting.
The 20s series also has a controller processor. These systems are an upgrade from the 10s series. These semi-automatic, low to high volume systems have fresh water storage for moisturizing the mass and for fire suppression. They also have a compost liquid storage chamber.
The new M-50 Oasis Comfort Station is a self-contained composting toilet building constructed of laminated fiberglass. This portable system is well suited for remote areas where usage is relatively low.
Clivus systems still utilize the simplest design and tend to shy away from mechanical devices which may cause operation and maintenance problems in the field.
State system capacities are based on average daytime temperatures of 65 degrees Fahrenheit or above which is achieved in a warm climate or in a heated space.
Clivus Multrum, Inc. is dedicated to effectively solving the on-site human waste problems facing most all of our public agencies. Clivus products carry $1,000,000 liability insurance and several of the systems have passed the rigorous test required by the National Sanitation Foundation. Clivus maintains a network of sales representatives and service personnel throughout the world. The Public Facilities Division was recently moved to Phoenix, Arizona to better serve the western United States.

ATTENDEES OF WORKSHOP

**LUVERNE GRUSSING	Bureau of Land Management (Idaho)
BARBARA RICHEY	USFS, Mt. Baker-Snoqualmie NF
DAN VERRALL TREVOR JONES MALCOLM TALBOT	Alpine Club of Canada
STEVE EVACK	Parks Canada
MARY COLEMAN	Waterton Lake NP, Canada
**RUTH SCOTT BILL BACCUS HERSCHEL LESTER MARTHA HUTCHINSON RICH (Chigger) STOKES STEVE CHAFFEE DAVE COLTHORP JIM CHAMBERS	Olympic National Park
RICHARD ENGLE	Pacific Northwest Regional Office
JACK POTTER JEFF HARKER	Glacier National Park
DAVID KARASZEWSKI	Zion National Park
**JOE ARNOLD	Rocky Mountain National Park
SCOTT RUESCH	Sequoia National Park
DON MANN KELLY BUSH	North Cascades National Park
JOHN WARDER	Klondike Gold Rush, Alaska
**BILL MAKEL	USFS, San Dimas, California
CLIFF MCDONALD	USFS, Bend, Oregon
PHIL POLLARD	Pacific Northwest Region
**JOHN COLLINS	USPHS, Rocky Mountain Region
KORWIN KIRT CHRISTOPHER ENGLISH ALAN PALISCA	Yosemite National Park
PETE NELSON	Oregon State University

BACKCOUNTRY HUMAN WASTE MANAGEMENT
MARCH 30-31, 1993

FUTURE ISSUES

Item #	ISSUE	Priority #
15.	Provide design guidance document for backcountry waste (similar to USFS frontcountry document)	1
7.	Move waste problems up in management/budget priorities	2
2.	Capacities of areas (consider limiting use)	3
1.	Potential for danger with pathogens in areas with pit toilets.	4
8.	Commitment from top management	5
17.	Need toilet selection guide	5
21.	Conduct another study for Backcountry Waste Management (RAMWAD update)	6
5.	Reducing costs thru use of alternatives (new technologies)	7
13.	Need to focus WASO on coordination and communication of issues and funding.	8
3.	Wide variance of minimum tool in wilderness areas/ handling crowds in areas where helicopters are being used.	9
14.	Fund full-time position for coordination	10
4.	Decisions on control methods.	
6.	Look into lobbying for funding.	
9.	Funding to get together again (individual site visits?)	
10.	Need assistance in videotaping.	
11.	Must make someone <u>responsible</u> for coordination in each area.	
12.	Need to find one person who has everyone's support for National Coordinator.	
16.	Need knowledgeable person to develop design guidance document	
18.	Each area should be assigned a chapter to do for the design guidance document.	
19.	Consider use of drainfields (done in Europe)	

20. *No actual experience with disposal and use of end products; must keep up the learning.*

22. *Summarize RAMWAD for users, not just engineers.*

23. *Use Vail Agenda to find funding sources.*

24. *Involve each agency's Wilderness Coordinator*

25. *USFS Wilderness Coordinator may not be interested due to desire for few facilities in wilderness.*

26. *Use resource as leverage*

27. *International travel and communication is sometimes administratively difficult.*

Note: If Priority # is left blank, item did not fall in Top Ten based upon point total

Point Totals

1.	128 pts.	10.	31 pts.	19.	2 pts.
2.	145	11.	66	20.	24
3.	84	12.	33	21.	101
4.	29	13.	87	22.	40
5.	90	14.	82	23.	63
6.	58	15.	192	24.	25
7.	168	16.	63	25.	4
8.	115	17.	115	26.	41
9.	79	18.	67	27.	8

Suggested Groupings

1. *Items #6,9,14,23 Funding issues - meetings, coordination, sources*

2. *Items #11, 12, 13, 14, 24, 25 - Coordination for communications and action - who to do, how to do it, and how to fund it*

3. *Items #15, 16, 17, 18 - Provide guidance document - design, toilet selection, who to do it*

4. *Items #21, 22 - RAMWAD Update - summarize for field, not just engineering document*

5. *Items #7, 8, 26 - Getting commitment from top management to keep on top of the issue; budget, using resource as leverage*

Point Totals and Priorities Based on Groupings

Item #	Items Grouped	Point Total	Priority #
15.	15,16,17,18	437	1
7.	7,8,26	324	2
11.	11,12,13,14, 24,25	313	3
6.	6,9,14,23	282	4
2.	2,7	174	5
21.	21,22	141	6
1.		128 pts.	7
5.		90	8
3.		84	9
10.		31	10
19.		2	13
20.		24	11
27.		8	12

Communication Needs

Issue #	ISSUE	Priority #
11.	Toilet selection guidance document	1
10.	Design guidance document	2
2.	Provide information on different systems in one place.	3
15.	More conferences (how frequent) a. every few years b. every year c. every 4 years	4
18.	List of contacts.	5
1.	Newsletter	6
8.	Extend current NPS taskforce.	7
6.	National Coordinator.	8
7.	Whatever is done, needs continued participation by all.	9
4.	Coordinate communication with universities (film students, journalism students)	10
3.	Videotape systems over summer, share in winter.	NA
5.	Alpine Club will coordinate newsletter	NA
9.	Challenge/Cost Share partnerships	NA
12.	**International** communication coordinator (develop communication with other countries thru use of international coordinator - International Affairs Office)	NA
13.	United Nations funding of #12.	NA
14.	Skipped #	
16.	Make conferences available/known to more countries	NA
17.	Computer communication	NA

Point Totals

1.	161 pts.	10.	203 pts.
2.	201	11.	204
3.	60	12.	76
4.	81	13.	13
5.	34	14.	1
6.	98	15.	173
7.	93	16.	52
8.	103	17.	62
9.	67	18.	168

Suggested Groupings

1. *Items #10,11 - Design and toilet selection guidance document*
2. *Items #12, 16 - Communicate with more countries including invitations to conferences.*

Point Totals and Priorities Based on Groupings

Item #	*Items Grouped*	*Point Total*	*Priority #*
10.	*10,11*	*407*	*1*
2.		*201*	*2*
15.		*173*	*3*
18.		*168*	*4*
1.		*161*	*5*
12.	*12, 16*	*128*	*6*
8.		*103*	*7*
6.		*98*	*8*
7.		*93*	*9*
4.		*81*	*10*
3.		*60*	
5.		*34*	
9.		*67*	
13.		*13*	
14.		*NA*	
17.		*62*	