



***NP*Safe**

Safe Acts & Attitudes Foster Excellence

Hearing Loss Prevention: It Sounds Good To Me!

TELNPS Participant Guide

Prepared by
NPS Risk Management Division

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How to Interact with the Instructor

We encourage you to ask questions and share your comments with the instructors throughout this TELNPS course.

If you were physically in the classroom with the instructor, you would raise your hand to let him know you had a question or comment. Then you would wait for the instructor to recognize you and ask for your question. We are all familiar with that “protocol” for asking questions or making comments.

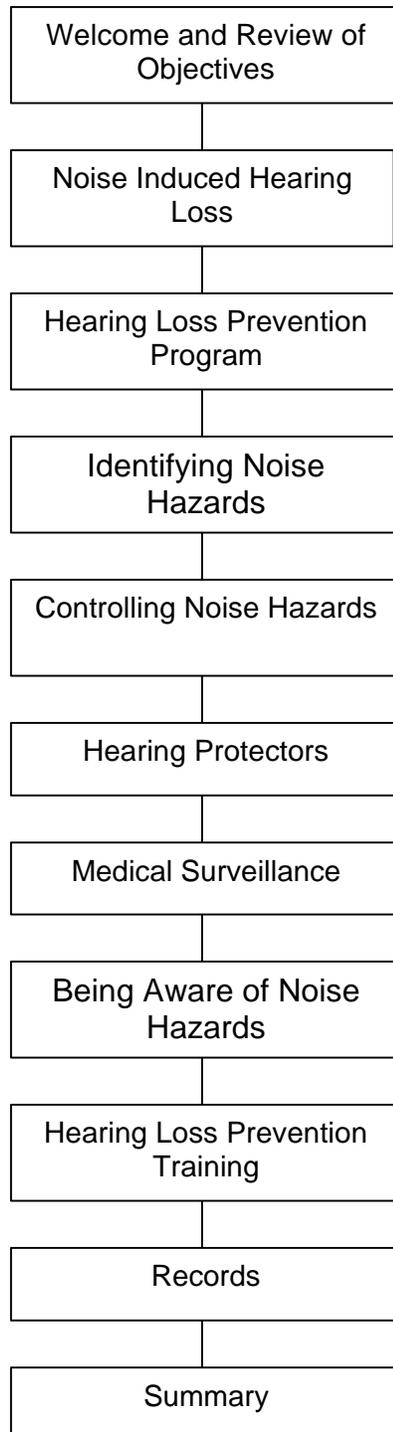
With TELNPS courses there is also a “protocol” to follow to ensure you can easily ask questions and others can participate as well. It may seem a little strange at first asking a question of a TV monitor. Remember, it is the instructor you are interacting with and not the monitor. As you ask more questions and participate in more TELNPS courses, you will soon be focusing only on the content of your question and not the equipment you are using to ask it.

As part of the TEL station equipment at your location, there are several push to talk microphones. Depending on the number of students at your location, you may have one directly in front of you or you may be sharing one with other students at your table.

*When you have a question, press the push to talk button and say,
“Excuse me [instructor’s first name], this is [your first name]
at [your location]. I have a question (or I have a comment).”
Then release the push to talk button. This is important.
Until you release the button, you will not be able to hear the instructor.*

The instructor will acknowledge you and then ask for your question or comment. Stating your name and location not only helps the instructor, but also helps other students who are participating at different locations to get to know their classmates.

Hearing Loss Prevention: It Sounds Good To Me! – Course Map



Course Objectives**Notes**

At the conclusion of this course, you should be able to--

1. Explain what noise levels are considered harmful.
2. Explain how permanent hearing damage can result from harmful noise levels.
3. Identify other health hazards that may result from harmful noise levels.
4. List the actions that employers and employees should take to prevent NIHL.
5. Explain how proper use of hearing protectors reduces the risk of NIHL.
6. Determine the appropriate hearing protectors required for a specific noise hazard.
7. Explain the proper care and maintenance that should be given to hearing protectors.
8. Explain how audiometric testing can be used to monitor NIHL.

Today's Top Ten List -

What are the top ten noise hazards NPS employees are exposed to on a regular basis?

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

Why All the Noise About Noise? NIHL!**Notes**

Why should you be concerned about the level of noise you are exposed to in the course of your workday?

When you are exposed to average noise levels of ____ dB or greater during an 8-hour workday, you run the risk of **Noise Induced Hearing Loss** (NIHL).

Hearing loss is especially dangerous because it is p_____ and p_____.

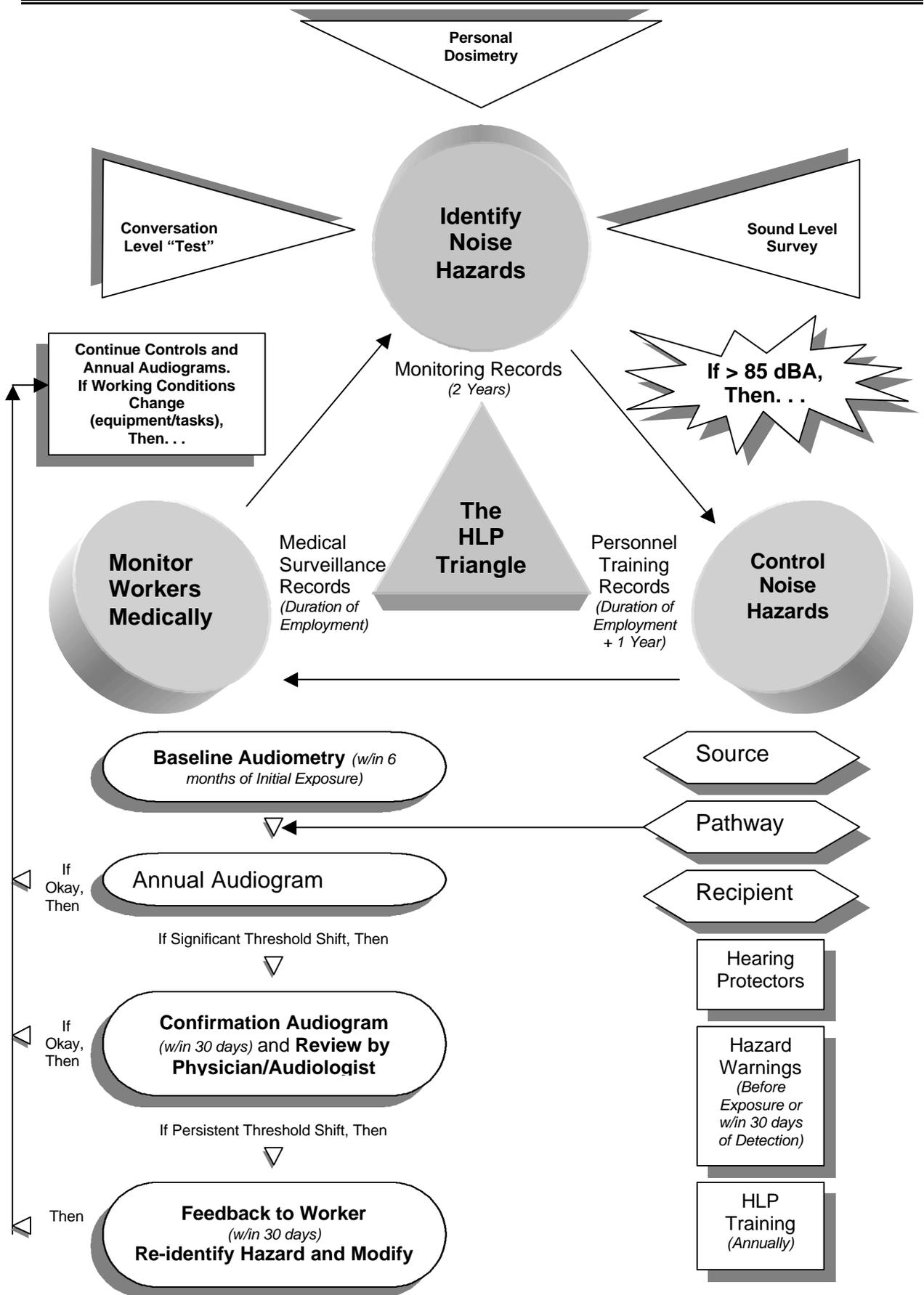
Other health issues that often accompany hearing loss are:

- Tinnitus
- Fatigue
- Stress
- Heart Disease
- Increased Lost-time Accidents
- Decreased Productivity

Seven Elements of a Hearing Loss Prevention Program

1. Identify Noise Hazards
2. Control Noise Hazards
3. Provide and Use Hearing Protectors
4. Provide Medical Surveillance
5. Communicate Noise Hazards
6. Train Noise Exposed Workers
7. Keep Records

See the flowchart, "The HLP Triangle," on the next page.



Element One: Identify Noise Hazards**Notes****The Magic Numbers:**

- Any average exposure over ___ dBA is considered hazardous and requires that we implement a HLP program.
- Any exposure to continuous, intermittent, or impulse noise shall never exceed ___ dBA.

Be aware of **red flags** that signal hazardous noise:

- Any workspace that is so loud that it is uncomfortable to work in may be hazardous.
- Any workspace in which you have to raise your voice to hold a conversation with someone who is within arm's length of you may be hazardous.

These are indicators that the workspace should receive further attention in identifying and controlling potential noise hazard.

Element Two: Control Noise Hazards

When the Occupational Exposure Limit (OEL) is exceeded, supervisors and workers take specific **control measures** to protect themselves in the future. These measures can be tackled by looking systematically at three fronts. As a quick review, match each group of control measures with the noise hazard "front" each is addressing.

_____ **Source** _____ **Pathway** _____ **Recipient**

A. Using sound absorptive materials in walls and flooring, using acoustical enclosures or partial barriers, using acoustical pipe lagging and pipe hangers, and increasing the distance between the source and the recipient.

B. Rotating workers, limiting the *duration* of workers' exposure to hazardous noise, and instructing employees in the proper use of *hearing protection*.

C. Controlling noise during the *design or procurement* of equipment ; Maintaining, modifying, and replacing noise hazardous equipment and equipment processes.

Element Three: Choosing Hearing Protectors**Notes**

When worn correctly, hearing protectors will greatly reduce the risk of NIHL by lowering the _____ level of sound that can reach and damage the ear.

Refer to Appendix A for tables comparing and contrasting hearing protectors.

How to Calculate Real “Real World” Exposure Levels:

To compensate for known differences between laboratory-derived noise attenuation values and the protection obtained by a worker in real-life situations, you should:

Subtract 25% of the manufacturer’s NRR for earmuffs, 50% for formable earplugs, and 70% for all other earplugs.

Randy and the “Real World”

If Randy operates a piece of equipment that produces a 100 dBA exposure level and is given muff type hearing protectors with a 20 dB NRR (noise reduction rating), what is Randy’s “real-world” exposure level, and are the hearing protectors adequate?

What if Randy were using formable foam type ear protectors? What would his “real world” exposure level be? Would those ear protectors be adequate?

Get in the Routine! Keep your park in compliance and protect yourself consistently by:

- *Wearing hearing protectors any time you are exposed to noise at or above 85 dBA.*
- *Wearing double hearing protection (i.e., ear plugs and earmuffs simultaneously) whenever you are exposed to noise at 104 dBA or higher.*

Rule: The best hearing protection is the one that you will wear correctly.

Element Three Continued: Using and Caring for Hearing Protectors

Hearing protectors will only provide the NRR we expect as long as they are kept in like-new condition. Therefore, knowing how to **maintain** each type of hearing protector and when to replace it is essential. The following checklist may be helpful:

Maintenance and Disposal

- Wash reusable earplugs with soap and water daily. Dry them and store them in a closed container to keep them clean.
- Replace earplugs when they are cracked or worn, brittle or stiff, or no longer fit.
- Wipe earmuffs clean when necessary. Wash foam inserts and rubber cushions with soap and water.
- Replace worn cushion, bent headbands and flaking foam inserts.

Element Four: Medical Surveillance

- Once a year, all workers exposed to noise hazardous work conditions are retested to determine changes in hearing relative to the baseline audiogram.
- When the *audiogram* detects a change in the hearing threshold level in either ear that equals or exceeds an average of 10 dB or more at 2000, 3000, and 4000 Hz, or, there is a change of 15 dB or more at any of the test frequencies (500, 1000, 2000, 3000, 4000, or 6000 Hz) this is referred to as a *significant threshold shift*.

Kate's Audiometric Testing: Does She or Doesn't She? The Threshold Shift Question.

Look at the results of Kate's audiometric testing below. Does she or doesn't she have a significant threshold shift? If so, what year did it happen in? Is any follow-up action required?

Annual Audiometric Testing Results			
Frequency	Baseline Testing Hiring	Annual Testing End of 1 st Year	Annual Testing End of 2 nd Year
500 Hz	10	10	10
1000 Hz	10	10	10
2000 Hz	10	15	20
3000 Hz	15	20	25
4000 Hz	20	30	35
6000 Hz	15	15	20

Element Five: Being Aware of Noise Hazards**Notes**

Look for the following **information** on warning signs or labels:

- Picture or Verbal Caution or Warning.
- Indication of the dB Level of the Hazardous Area or Equipment.
- What Protective Measures to Take (for example, what type of hearing protectors to use).

Element Six: Hearing Loss Prevention Training**Notes**

The type of training you are participating in now should be *repeated annually* to provide reinforcement and updated information. It should address, at a minimum, the following **topics**:

- The physical and psychological effects of noise and hearing loss.
- Hearing protector selection, fitting, use, and care.
- Audiometric testing.
- The roles and responsibilities of both park and workers in preventing noise induced hearing loss.

Checkmark or highlight any of the four that we have addressed so far in our training today. Have we left anything out?

Element Seven: Records**Notes**

Your supervisor is responsible for maintaining **accurate and easily accessible records** of the following:

1. *Area noise and personal exposure monitoring.*
2. *Medical surveillance—audiometric tests.*
3. *Personnel training.*

These records are kept for the purpose of identifying and controlling noise hazards, and then medically monitoring the effects of those controls so that you continue to be protected as workplace conditions change. You have access to these records as you need them.

Summary**Notes****Did we meet the course objectives?**

Look at the objectives we set out to meet at the beginning of this course. Highlight the ones that have been met to your satisfaction today. Put a question mark by any you are still unclear about. Let's answer those questions now.

Helpful Resources:

- OSHA Noise and Hearing Conservation Web site.
www.osha.gov/sltc/noisehearingconservation.
- NIOSH Hearing Loss Prevention web site.
www.cdc.gov/niosh/topic/noise
- NIOSH. 1998. Occupational Noise Exposure: Criteria for a Recommended Standard.
- Berger, E.H., Royster, L.H., Royster, J.D., Driscoll, D.P., and Layne, M., Eds. 2000. The Noise Manual, 5th Ed. AIHA Press, 796 pp.
- Hearnnet.com. A non-profit hearing information source for musicians and music lovers. "Hearing protection is a cool thing"—dpb.

Appendix A Hearing Protector Selection

Comparing Ear Plugs and Ear Muffs		
	Ear plugs	Ear muffs
Compatibility	Glasses, earrings, hair and safety gear do not interfere with the seal.	Acoustic seal against the head can be interrupted by hair, eyeglass temples, safety gear. Can also interfere with hairstyles.
Use in tight spaces	Ideal for tight spaces. Can be used in conjunction with certain safety equipment	Can interfere with movement in tight spaces.
Monitoring Use (compliance)	Difficult for supervisor assure use. Difficult to assess fit.	Use easily checked. Difficult to assess fit
Hot environments	Cooler than muff. Some individuals may experience sweating in ear canal.	May be uncomfortable in hot climates. Sweat likely to buildup under ear cups.
Cold environments	Can be worn under hats and mufflers. Not easily inserted in cold temperatures or gloved hands.	Ear cups can provide warmth. Easily donned and adjusted with gloved hands. Cushions and seals can stiffen in cold temperatures
Storage, portability	Easy to store and carry. Easy to lose	Bulky. Not as easily lost.
Modification	May be readily modified to improve comfort at expense of protection.	Bands may be stretched to relieve pressure, cups may be modified for ventilation, at expense of protection.
Infection, cerumen buildup	Cannot be used if wearer has an ear infection, impacted wax, or ear canal medical condition.	May be used in presence of internal and minor external ear medical conditions. Should not be used when pinna or circumaural skin conditions exist.

Appendix A Hearing Protector Selection (continued)

Advantages and Disadvantages of Hearing Protector Types		
Hearing protector	Advantages	Disadvantages
Category: Ear Plugs		Small. May be difficult for some with large or blunt fingers to insert
Foam Ear plugs or "Roll-downs"	One size fits most of the population. Even partially fitted, they can provide good seal. Disposable, but may be reused several days if kept clean. Extra small and extra large sizes now available for better fit and comfort Low cost.	Must be rolled with fingers—hand must be clean for insertion so that caustic or irritating substances or sharp or abrasive material are not introduced into ear canal. (How long lasting?)
Pre-molded Ear plugs	Do not require rolling for insertion. Longer lasting than foam (as long as 3 months continuous use).	Rely on flanges or sealing rings to create an acoustic seal—requires several sizes (as many as 5) to properly fit the workforce. Up to 10% of population may require different sizes for right and left ear. Real world attenuation performance low due to difficulty in achieving seal. More expensive than foam.
<i>Formable Ear plugs (cotton/wax, silicon putty)</i>	Malleable silicon earplugs are popular for preventing water entering ear canal during swimming and bathing.	Generally, have little application in the HLP programs. Wax product can be messy to use and leave residue in ear canal. Less flexible—seal can be lost with movement of the jaw.
<i>Custom molded Ear plugs</i>	Less likely to be misinserted in the field. Incorrect insertions easily detected. Customization can serve as incentive to wear earplugs. Generally comfortable to wear (but tighter fit that improves attenuation, decreases comfort).	Good seal in the ear canal relies on adequate hold by the outer ear portion of the mold. Skill and time required to take individual impressions. Often provide less protection than other well-fitted earplugs.
Semi-insert Ear plugs or Canal caps, bands, semi-aural devices	Easily inserted and removed. Conveniently hang on neck when not in use.	"Occlusion effect" may be more pronounced and objectionable. Can lose seal when bumped.
Category: Ear Muffs	Easy to use. One size fits nearly all adult users. Hard hat attachment options available. Good for intermittent exposures. Without the hygiene concerns of earplugs. Use is easily monitored by supervisors.	Unusual features such as prominent cheekbones and depressions behind the jaw may prevent good seal. Require sufficient force to conform to head and provide good seal—headbands will become distorted with time. Attenuation easily compromised by many factors.