Newsletter

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From the Chair

MWG contributes significantly to biodiversity conservation

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No matter how much effort is invested in promoting the protection of large forested stands and connectivity corridors to foster animal movements between significant habitats, there is always a biologist or a forester somewhere who will come up with a rationale to justify harvesting these areas! Even though productive American marten and fisher populations can be maintained in landscapes that have been managed with sound spatio-temporal parameters, the fate of these species, and biodiversity in general, ultimately depends on the knowledge, expertise, and common sense of professionals involved in landscape planning. Inevitably, valuable habitat remnants get destroyed and biodiversity associated with structurally complex forests disappears for significant periods of time. Of course, there must be political will to promote intelligent use of our natural resources. The constant education of biologists and foresters involved in the management of forested landscapes is also vital, and our *Martes* Working Group can play an important role in advocating habitat conservation. In western North America where American marten and fisher populations benefit from the maintenance of large tracts of late-successional forests, maintaining their populations means conserving an array of species associated with structurally complex forests. In other words, by advocating the proper management of *Martes* habitats, we can make friends with many scientists and associations concerned with the conservation of late-successional forests and animal communities. With the release of our 2004 proceedings last year, I had the opportunity to become acquainted with several scientists dealing with the conservation of arthropods, birds and ungulates in managed landscapes, and who benefited from our publication. What a motivation it is to meet people who can use our work to improve their program. *Martes* biologists are coming with ideas and management solutions that can be valuable for the conservation of biodiversity around the world.

Martes research and management can significantly contribute to the conservation of our natural heritage, and we should encourage our university libraries to acquire our proceedings and motivate students to join our group. With the upcoming *Martes* Symposium in 2009 in Seattle (Washington State, USA), we should start now to invite our colleagues from government agencies, biology and forestry departments, museums, various conservation organizations, etc., to participate at this gathering. Some people would like to come, but they find out too late to get funding from their organization. Others do not participate simply because they do not know that we exist. Fortunately, Jean-François Robitaille and Liane Villano have produced a new MWG website that reviews our objectives, details our history, and updates the public about our activities. One can refer to most of our newsletters since the creation of our group, and see us all interacting at symposia through an extensive collection of photographs. This website will go a long way in promoting our upcoming symposium, and *Martes* conservation in general. So, spread the news about MWG and the upcoming symposium. At the end of the day, biodiversity and all of us will benefit from it.

Martes Working Group Steering Committee, 2004 - 2009

Chair	**Gilbert Proulx**
Treasurer and Membership	**Erin O'Doherty**
Webmaster	**Jean-François Robitaille**
Newsletter Editor	**Amie Mazzoni**

MWG Website Update

Preview of the New Home Page

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Message from the Webmaster

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Dear colleagues,

Our new web site is now online (www.martes.laurentian.ca). Your comments for improvements at any level (format, contents) are welcome. I would like to draw your attention to some particulars:

- Format: the selected format may appear sort of matter-of-fact (although we have simply the best logo in town), but we like to think it is more efficient this way, leaving more time to devote to contents. This is a no-frill image that I trust will encourage members to contribute contents, thus better reflecting the capacity of the MWG.

- Format: the site is now entirely bilingual, which may help draw attention (and hopefully, interest) from a new audience, especially in Canada and Europe. For that, we must thank our LU President, Dr. Judith Woodsworth, for implementing a rule of complete bilingual coverage. It is worth noting that this web site is also more transferable than before, should the need arise, because it is based on Microsoft software. Document formats allowed by the software are limited to Word, Excel, and PDF, so please keep this in mind when submitting new documents to publish.

- Format: the software used for the web site does not allow at present functionality such as forums, or payment, form exchange, etc. We will continue to exert pressure here at Laurentian to gain those functionalities.

- Bibliography: We have created a new bibliography (*.doc, *.pdf) that should serve our audience better. I think that we could still better emphasize the Group's monographs, and I will possibly create separate links for these. Also, note that the literature review is by no means exhaustive, although the search effort was extensive. Again, please submit your titles (new or not cited) preferably in *.doc format, so we continue to build this database. Titles should be limited to publications related to *Martes* spp., of course.

- In progress: you will notice several areas still 'in progress', where we included an invitation for MWG members to submit new material. Allowing submissions only from our members could have the following outcomes: more originality, better control of quality and scientific level, better credentials for the Group, and possibly new members. I hope we will get a good response and achieve a dynamic site worth re-visiting on a periodic basis.

- News: There is still no document to publicize the upcoming symposium, but this will no doubt be corrected shortly. (See page 18 of this newsletter for information on the upcoming symposium).

- Images: at present, too many Images links (i.e. Laramie and Edmonton symposia, most *Martes* spp.) are 'under construction' and this is because we simply miss original material to include, a rather surprising and almost embarrassing situation for a world-class organization. I really look forward to receiving image submissions (*.jpg, *.tiff formats preferred) for most *Martes* spp, especially from the Orient, but also from Europe (perhaps some original images from Bialowieza forest ?). The guaranteed and explicit photo credit should encourage you, MWG members, to submit. Serial photos will be organized and labeled using Powerpoint, and published as *.pdf. Powerpoint documents will be copied to the author(s) upon request. A good coverage of lesser known *Martes* spp. would be an original contribution from our Group, and thus a good marketing tool.

Please enjoy your visit of our web site and I look forward to your submissions.

Special thanks to Liane Villano (above), student assistant, Laurentian University, for her work on the website literature review, and on the tedious clerical task of formatting the web pages.

CANADA

Ecology of fishers in boreal mixed-wood forests of north-eastern British Columbia

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Fishers (*Martes pennanti*) are medium-sized members of the Mustelid (weasel) family that occur in the lowland forested areas of central and northeastern British Columbia. Research in other areas of BC has shown that forest harvesting that focuses on late-successional forests may have detrimental effects on fisher populations. However, gaps in the knowledge of the habitat relationships of fishers in the Peace region hamper the ability of forest licensees to adequately manage for fisher habitat. Through inventory and research of a population of fishers in the Kiskatinaw Plateau ecosection (Fig. 1), this project addresses several primary objectives to further support sustainable fisher populations in the Peace River Region.

To estimate the density of fishers in this ecological region, we completed 3 hair-snagging sessions at 46-7x7 km grid cells throughout the Kiskatinaw Plateau ecosection between 22 January and 26 April 2006. We collected 229 hair samples at 56 sites in 35 grid cells during the 3 sampling sessions. We detected 7 fishers (5M, 2F), 35 American martens (*Martes americana*), 8 red squirrels (*Tamiasciurus hudsonicus*), 3 short-tailed weasels (*Mustela erminea*), 3 flying squirrels (*Glaucomys sabrinus*), and 1 black bear (*Ursus americanus*). One sample failed to amplify and 1 sample contained hairs from more than 1 species, so could not be identified. We did not recapture any of the 7 individual fishers during the sampling sessions, so we were unable to estimate population size in the inventory area.

We radio-tagged and monitored fishers within the research project area to examine the habitat relationships of fishers in the Kiskatinaw Plateau ecosection. Between December 2006 and March 2007, we live-trapped 91 sites for 1162 trapnights to capture and radio-tag fishers within the research project area. We radio-tagged 12 fishers (4M, 8F) during this period. The rate of captures during 2007 was substantially higher than during 2006. As of 21 March 2007, 15 radio-tagged fishers were being monitored, including 5 of the 6 fishers that were monitored during 2005-06.

We collected 239 radiolocations of 14 radio-tagged fishers between 1 April 2006 and 21 March 2007, of which 230 were suitably precise for inclusion in habitat and home range analyses. We identified 4 natal dens and 3 maternal dens from 4 reproductive females during April and May 2006: 2 in declining balsam poplars and 2 in trembling aspens, which were somewhat typical of dens reported for fishers elsewhere in British Columbia. We documented fishers resting in or under accumulations of woody debris, subnivean cavities under shrubs, in cavities in balsam poplar or aspen trees, under single pieces of coarse woody debris, or on platforms in black or white spruce trees or lodgepole pine. We also radiolocated fishers resting in abandoned buildings, underground burrows, abandoned beaver (*Castor canadensis*) lodges, magpie nests in willow, on the snow surface and in snow burrows not associated with any habitat element.

Future work planned for 2007-08 includes continued monitoring of radio-tagged fishers, habitat evaluations, publishing peer-reviewed scientific reports, and extension of the results of this work to forest licensees, trappers, and the oil and gas industry. Inge-Jean Mattson, a graduate student under the supervision of Chris Johnson at the University of Northern British Columbia, will be starting on the project in early 2007.

A copy of the 2006-07 year-end report is available at http://www.artemiswildlife.com/projects.htm under the Kiskatinaw Fisher Research and Inventory project.

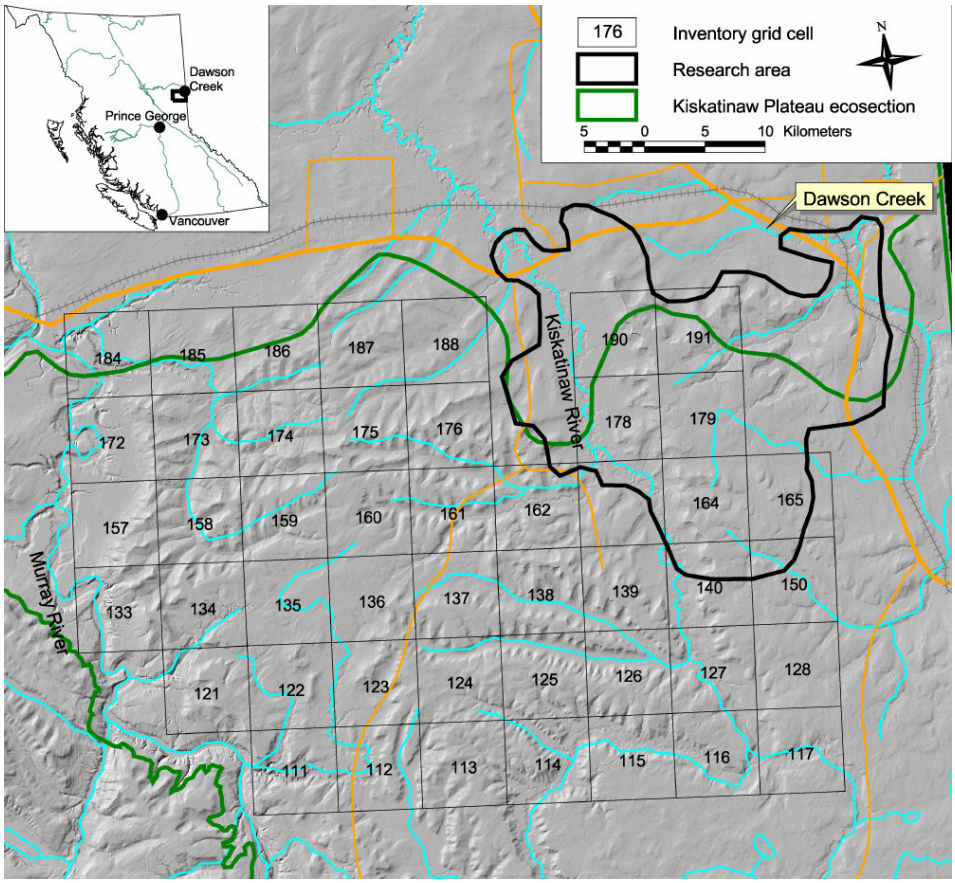

Figure 1. Location of research and inventory study areas in the boreal forests of north-eastern British Columbia.

Left: Marten emerges from maternal den early March 2007, in Northern Quebec, Canada, in the Boreal Forest (black spruce forest) near 50°N.

Photo Credit: Marianne Cheveau
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UNITED STATES

Marten Sexing and Aging Techniques

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Monitoring demographics of harvested marten (*Martes americana*) is being done in various jurisdictions in North America. Age and sex ratios in the harvest provide a useful index of population changes and harvest intensity. Field biologists are often tasked with providing raw data and subsequent analyses with which to make management decisions. For marten, this entails correctly determining sex and age class of carcasses provided by fur trappers. Many methods have been proposed to accurately determine sex and age class. I have been collecting demographic information on marten from Idaho and Alaska for over 3 decades, and, based upon several thousand carcass necropsies, have adopted the following techniques.

I. SEXING
A. Skins

Males average about 10% larger than females (Figure 1). With harvest generally commencing in November or December, young-of-the-year marten (both sexes) have reached their adult lengths, although mass continues to increase slightly. Generally, skins are fairly easy to sex based on length alone. Additionally, males usually have thicker and heavier leather, and, with practice, the sound of the crinkling leather gives an indication of sex. Sometimes, however, smaller males and larger females may overlap. The preputial orifice is definitive for males, but is often difficult to see or feel. If questionable, it's easy to look at the hair growth pattern anterior to the anus. On males (any age) the hair points anterior in a narrow patch about 1.5 cm long (immediately posterior to the penis sheath opening) and <1 cm wide. This is opposite of the direction of growth of the adjacent hair. On females, the hair in this section grows as the adjacent hair; always posteriorly (Figure 2). One additional clue as to marten sex in postpartous females is the fact that nipples (n=6) are often persistent. Swelled and darkly pigmented nipples that are noticeable are always an indicator of female pelts.

B. Carcasses

From southeast Alaska, body length, tail length, hind foot length, and carcass weight can all be used to grossly separate sexes. However, none of these external measurements are accurate 100% of the time. In interior Alaska, measurements of the same parameters are likewise unreliable for assessing sex of the carcass.

With complete carcasses, it is very easy to determine sex based on presence or absence of bacula and/or testis. However, some fur-takers inadvertently remove the baculum while skinning, while still others collect the testicles for making marten trapping lure, and these sexual characteristics are sometimes missing. Therefore, the biologist may be obligated to determine gender by examination of the carcass for presence/absence of the reproductive tract. For determination of age class (see next section), you'll need to look at the uterus anyway, so be sure to save this evidence. Lay the animal on its back. Make a 10-20 cm cut along the ventral midline immediately anterior to the pelvis, cutting through the muscle layers only. Do not cut into the urinary bladder or the large intestine. Reflex the bladder posteriorally, and search for the uterus. It bifurcates into long uterine horns just below the bladder, but over top of the bowels (large intestine). Obviously, males will be lacking this organ. In young-of-the-year females each of the uterine horns will be about 1mm wide, so the investigator must be very diligent in searching it out.

C. Skulls

In almost every standard skull measurement, males are larger than females. (Figure 3). From southeast Alaska (excluding *Martes caurina*), males average 84.3 mm and 46.4 mm in total length and zygomatic (total) width, respectively, while females average 76.6 mm and 41.9 mm, respectively. The largest females measured were 78.4 mm long, while smallest males were 80.8 mm, indicating no overlap. However, sample sizes in this analysis are extremely small (n = 26). In zygomatic width, males have a mean measurement of 46.4 mm, ranging from 41.8 to 51.8 mm, while females average 41.9 mm, with the range between 40.7 mm and 43.2 mm. Obviously, males are wider, with only a 3.8% overlap. If only uncleaned skulls are used for gender determination, zygomatic width can be used with a high degree of certainty.

From Interior Alaska, males average 86.5 mm and 48.9 mm in total length and zygomatic width, respectively. Females show a mean of 77.8 mm and 42.7 mm in total length and zygomatic width, respectively (n = 287 males, 181 females; all age classes combined). Thus, in 468 total skull length measurements, males and females from interior Alaska have a 1.3% overlap, while in

zygomatic width a 7.6% overlap is indicated. Obviously, total skull length would be a reasonably good separator (using 81.0 mm as separation point), while zygomatic width is less useful (contrary to Ontario marten reported by Brown 1983 and Strickland and Douglas 1987).

D. Femurs

The length of the femur can be used reliably to distinguish gender in marten taken during the open trapping season (Figure 4). From southeast Alaska, male femur lengths range from 68.5 mm to 75.8 mm (mean = 73.4 mm), whereas females range from 63.0 mm to 66.6 mm (mean = 64.1 mm). Obviously, there is no overlap, so this measurement (67.0 mm) can be used with 100% certainty. From interior marten, males range from 73.2 to 81.7 mm (mean = 77.2 mm), while females are from 64.6 to 71.1 mm (mean = 66.9 mm). In the absence of genitalia, the length of the femur is the best measurement to use to discriminate between the sexes for Alaskan marten. This measurement can be recorded from cleaned or raw, excised femurs.

II. AGING
Skins

As indicated earlier, young-of-the-year marten reach adult lengths prior to the opening of trapping seasons, so aging criteria based on skin length is not practical. However, adult, post-partous females usually retain enlarged nipples following suckling of young, and this can be used as a clue to age class. It should be used only as an indicator, and should not be relied upon solely for age class determination.

Carcasses

Again, various length measurements cannot be reliably used to indicate age class of marten. I suspect there is a minor mass increase with increasing age class, but contending with dramatic overlap in individual sizes confounds these data.

Skulls

Sagittal muscle coalescence/sagittal crest.
As early as 1951, it was recognized that the formation of the sagittal crest, and the resultant coalescence of the masseter muscles, could be used to delineate age classes of marten (Marshall 1951, Whitman 1978). However, Strickland and Douglas (1987) cautioned strongly that this method has its drawbacks, especially for females. While it is a reasonable method for quickly differentiating young-of-the-year from other age classes (especially for males), it should not be used alone for age-class determination. As a quick rule-of-thumb, any male which has a sagittal crest longer than 2 cm is probably not a young-of-the-year animal, and females with any development of the sagittal crest (with, consequently, no gap between the superior coalescence of the masseters) is likewise, not a young-of-the-year specimen.

Sutures.
The midline nasal suture and the jugal-squamosal sutures can also be used as indicators of age in marten. Unfortunately, these criteria must be examined on cleaned skulls. In Alaska marten, cleaned skulls from most young-of-the-year animals will, upon air-drying, split apart at the jugal-squamosal suture, resulting in an easily identified young animal. Likewise, in young-of-the-year animals, the internasal suture is always uncemented. However, it appears that not all yearlings have fully closed nasal sutures, while not all young-of-the-year jugal-squamosal sutures are uncemented. Thus, suture closure can be used on most skulls to separate age class, but it is not infallible methodology.

Post-orbital constriction width. I believe more work should be conducted on Alaska marten populations to investigate the usefulness of this criterion as an indicator of age. While most standard skull measurements (on cleaned skulls) tend to continue to enlarge with age, the post-orbital constriction tends to diminish in size with age. Brown (1983) concluded that the post-orbital constriction continued to decrease in size until the age of 3 years. At this point, at least with Alaska marten, the post-orbital constriction measurement or a ratio between the post-orbital constriction and the zygomatic width are not sufficiently well studied to use as an age class indicator.

Tooth wear/canine measurements/pulp cavity. By the age of 18 weeks, young marten acquire their full compliment of dentition, so tooth replacement is not an indicator of age class during the trapping season. Tooth wear (especially canines) can provide a reasonable clue to the age class of a marten, but again, this must be used with caution. Animals harvested with the use of foot-hold traps sometimes chew on the trap, causing premature tooth damage and abnormal wear patterns.

Strickland and Douglas (1987) offer a good discussion on the use of canines (measurements and use of radiographs) to separate young-of-the-year animals from older age classes. Brown (1983) also investigated various canine measurements, but data reported therein are from eastern Canadian jurisdictions, and, because of the smaller size of those marten, cannot be used with certainty with Alaska marten. More research is needed.

Tooth cementum annuli. Cementum annuli counts are valid for use on marten. If time and funds are available, this is certainly the best option for determining age of harvested marten. I have consistently had good luck with Matson's Laboratory in Montana, at about $8.00/ sample. I suggest that you have Matson's do not only the lab work, but the age determination as well. They're good.

Femurs (suprasesamoid or suprafabellar tubercle)

Assignation of age class based on the suprasesamoid (or suprafabellar) tubercle was described for mink as early as 1957 (Greer 1957). Leach et al. (1982) used presence/ absence of the tubercle for aging marten. While I am a strong advocate of this method, it does have drawbacks. Determination of whether or not the tubercle is present is somewhat subjective, and takes practice to become proficient. Also, this method can only be used to separate young-of-the-year animals from older age classes (i.e., no actual age can be determined). I am currently investigating the use of various staining techniques for more clearly revealing the presence/absence of the tubercle. Stay tuned for further developments. Because the femur is relatively small in comparison to the entire carcass, and there is, as yet, no real commercial value in the femur (as there is with other osteological "parts"), obtaining samples from fur harvesters is not a problem. I highly recommend this technique for accurate determination of marten age class.

Baculum/Reproductive tract.
From male marten, it has been shown that the baculum may be used to differentiate age classes, but again, is only good for separating young-of-the-year animals from all other age classes (Marshall 1951, Whitman 1978, Brown 1983, Strickland and Douglas 1987). Mass of cleaned, dried bacula is better than linear measurements. From specimens taken during open trapping seasons in Alaska, bacula weighing less than 0.1 g are definitive for animals less than 1 year old.

Reproductive tracts from female marten can be used to give an indication of age. Animals that have not reached reproductive age (i.e., those less than 1 year old) possess small uteri (uterine horns generally less than 45 mm long, and no more than 1 mm in width). In combination with other criteria, measurements of uterine horns should be used to give an indication of age class.

SUMMARY
For determination of sex and age class in harvested marten, it is obviously best to obtain the entire carcass. This will provide a variety of clues, all of which may be important in consistently and accuracy. If actual age of the specimen is desired, counting cementum annuli is currently the only known method. However, due to problems with trappers mishandling carcasses (rot or desiccation), suppliers unable or unwilling to transport entire carcasses, or because of the evolving competition with skull buyers, obtaining whole carcasses is often impossible. Because of its utility for both sexing and aging, I believe that the femur (total length for gender determination; presence of suprafabellar tubercle for age class determination) is the most useful single item for management purposes.

For management purposes, it is my contention that adequate conservation of marten populations can be facilitated by monitoring sex/age ratios in the harvested portion of the population, with subsequent open season manipulations based on those ratios. The best criteria is the ratio of total young-of-the-year to adult (> young-of-the-year) females, which should not decline below 4:1.

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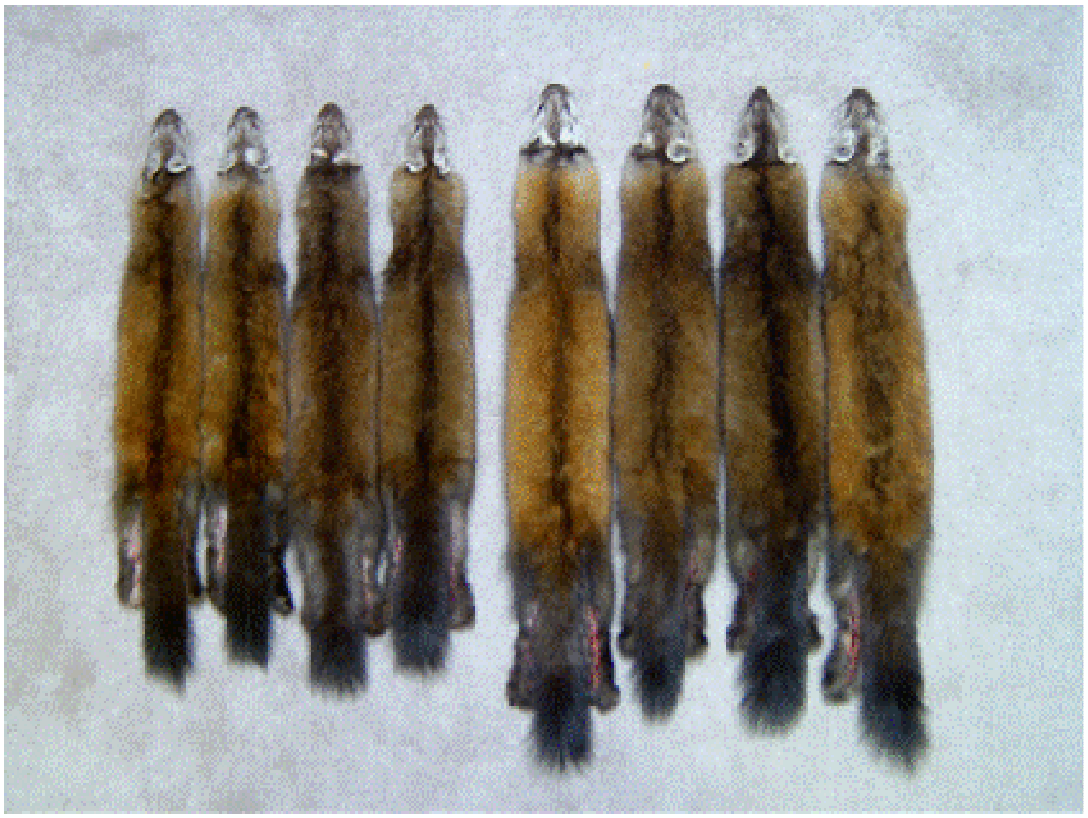

Figure 1. (Above) Relative pelt size differences of American marten displaying size differences between fe males (left) and males (right) in Alaska.

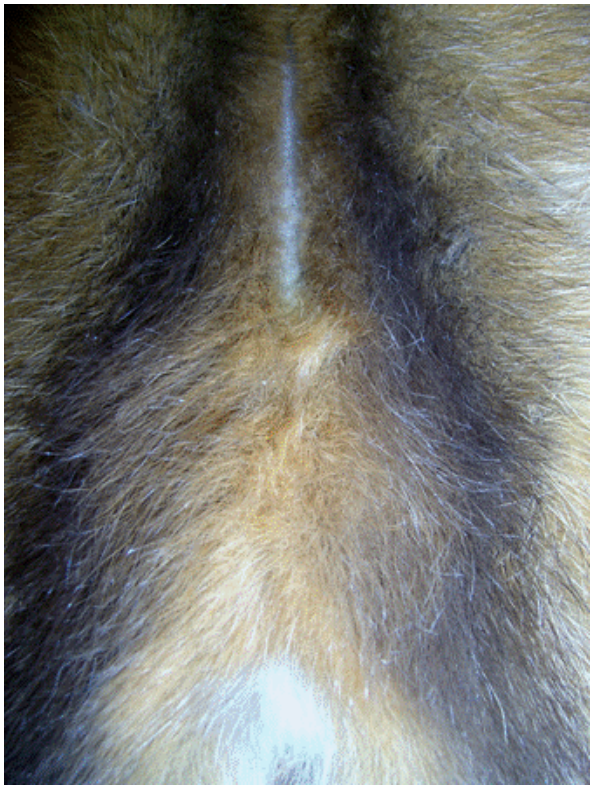

Figure 2. (Left) Determination of gender from skinned and dried American marten pelts showing inguinal hair growth direction on a female pelt.

Figure 3. Cleaned skulls of American marten showing relative size differences between adult male (left) and adult female (right) crania from Alaska.

Figure 4. Relative size difference in American marten femurs between females (left) and males (right) from Alaska. From southeast Alaska, 67.0 mm distinguishes males from females, while in interior Alaska, 72.0 mm is the critical measurement.

Vital rates and limiting factors of fishers in the southern Sierra Nevada Mountains and their response to forest management.

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Fishers in California have experienced a substantial reduction in geographic range and currently occur as two populations separated by over 400 km. As a result of this fragmentation, the fisher is considered a California species of concern, a USFS sensitive species, and its listing under the Endangered Species Act has been ruled by the USFWS as warranted but precluded. The southern Sierra Nevada population is of particular concern because of its geographic and genetic isolation, its risk of catastrophic decline, its unique ecological nature, and the unknown impact of proposed forest management actions.

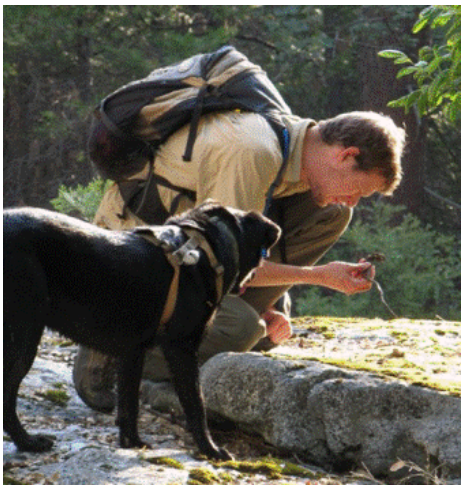
To address these concerns and identify appropriate management options, the U.S. Forest Service has initiated a seven year, comprehensive fisher research program in the Kings River project area of the Sierra National Forest. Designed to build on past research and to complement ongoing broad-scale monitoring efforts in the region, the program will combine a variety of traditional and innovative methods in order to document fisher habitat preferences and population vital rates, identify potential risks and limiting factors, and examine how these variables change in relation to landscape heterogeneity and forest management. The project will capitalize on proposed large-scale fuel reduction efforts in order to evaluate the effects of different fuel treatment options on an old growth dependant species.

The research design centers on overlapping three complementary techniques: live trapping and radio telemetry, the use of remote cameras, and detector dog surveys. This multifaceted approach, combined with genetic and hormone analysis, will allow us to address a number of critical questions. For example, microsatellite analysis will allow us to link scats collected by detector dogs to known samples collected during trapping. This will make it possible to explore the utility of scat locations for home range, habitat use, and other spatial analyses, reducing our reliance on invasive monitoring techniques. Serology analysis will allow us to explore links between factors such as habitat change, susceptibility to disease, and risk of predation.

Concurrent to our work and scheduled to begin in October 2007, the University of California Sierra Nevada Adaptive Management Program (SNAMP) fisher research project will also provide extensive information on fisher demographics and their response to forest thinning and fuel management. Both the USFS Kings River project and the SNAMP project will provide ongoing monitoring of 20 animals using similar methodologies, effectively acting as two replicates of a regional research effort. The resulting combined sample size of 40 animals per year over 7 years will allow us to look at how population vital rates vary over a range of landscape conditions. Of additional interest is the placement of the two study areas: the Kings River project is located in what is considered the heart of the Southern Sierra fisher population while the SNAMP program will take place on the northern fringe of the population. Differences in dispersal, habitat use, and/or survival between the two sites may illuminate why fishers have failed to recolonize the central Sierras despite nearly 50 years of protection.

Results from the Kings River project will be used, on an ongoing basis, to inform forest managers and to reduce any negative impacts of fuel reduction activities. In addition to the work conducted through UC Berkeley SNAMP, current collaborators include the University of Washington's Center for Conservation Biology, the University of California at Davis Department of Medicine and Epidemiology, the USFS RMRS Wildlife Genetics Lab, and the USFS PSW Redwood Sciences Lab. More information on the Kings River Project and associated fuel treatment activities can be found on the US Forest Service website at http://www.fs.fed.us/r5/sierra/projects/environassess/kingsriver/index.shtml.

Fisher kit emerging to investigate what followed mom home. Photo credit: R. Green.



Chris Zieminski (UW) investigates a scat as Marvin awaits his reward. Photo credit: S. Brink.

Adult, uncollared male fisher captured at a remote camera station. Photo credit: J. Garner.

ITALY

Italian and Sardinian populations of pine marten *Martes martes* described by means of nuclear and mitochondrial markers

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The European distribution of the pine marten, *Martes martes* (Linnaeus, 1758), spans from Scandinavia to the Meditarranean region, but becomes more and more fragmented in the southern peninsulas; in fact, the species is absent from most of Iberia, central Balkans and Greece, while in Italy it is patchily distributed (Mitchell-Jones et alii, 1999). The pine marten occurs also on many islands of the western Mediterranean as the Balearic Islands, Elba (Tuscan Archipelago), Corsica, Sardinia and Sicily. The origin of these insular populations may be due to different causes and, in particular, in the case of Italian islands, the pine marten seems to have reached the Tuscan Archipelago and Sicily through land bridges originated by the marine regressions of the last glacial event (Sarà, 1998). It is more difficult to define with precision the origin of the Sardinian population: the presence of the pine marten on the island seems to be due mostly to human intervention in pre-Roman or Roman age (Masseti, 1995), even if the superimposition of later individuals on the remnants of an older, pre-existing population cannot be completely ruled out.

Factors as a small number of founders combined with a limited or absent gene flow may account for a reduced genetic variability and incipient divergence from the populations of the Italian peninsula.

In order to shed light on the modes and tempos of the origin of the Sardinian population and to evaluate its degree of differentiation from continental ones, we are analysing pine marten specimens from Italy and Sardinia by means of genetic nuclear and mitochondrial markers.

Since in Italy the macromorphological features typical of the pine marten (body measurements, throath-patch colour etc.) may in some cases overlap those of the stone marten *Martes foina* (Erxleben, 1777), the actual belonging of the samples to the species *Martes martes* was preliminarly tested through a species-specific PCR-RFLP approach which allows the molecular identification of five species of European mustelids (Colli et al., 2005).

The total sample comprised 54 animals (14 from the

Italian paeninsula and 40 from Sardinia) characterized through the analysis of 7 microsatellite loci (described in Davis & Strobeck, 1998 and Fleming et al., 1999) and two fragments of d-loop and cytochrome b mitochondrial genes.

With the exception of one locus which was monomorphic in the Sardinian sample, the chosen microsatellite markers resulted to be polymorphic and altogether capable of discriminating between the two populations. In particular, the microsatellite data were analysed with different statistical techniques; all the results were concordant at the within-population level and of a genetic differentiation between populations. This evidence was confirmed by standard indices (expected heterozygosity, number of alleles per locus), Fst value (0.077; $P<0.001$), Analysis of MOlecular VAriance (AMOVA; 7.37% between populations, 92.63% within populations), Factorial Correspopndence Analysis and assignment test based on Bayesian statistics. Both these last analyses clustered the individuals according to their geographic provenance, despite of the differences in sample sizes.

A preliminary analysis of mitochondrial sequences revealed similar values of mean number of pairwise differences (MNPD) and nucleotide diversity (π) for the European and Italian populations (MNPD 2.10±1.24 and 2.10±1.27, respectively; π 0.006±0.004 in both cases), while the Sardinian ones showed higher values for both indices (MNPD 2.72±1.50; π 0.009±0.006). AMOVA analysis and Fst computation confirmed the divergence trend already disclosed by microsatellite markers, even if with higher values (17.4% at within population level and 82.6% at between population level; Fst 0.174, $P<0.05$). By comparing novel mtDNA sequences with genetic data already available for European specimens, further analyses will be conducted to unravel the phylogeographic relationships between populations and to interpret the molecular evidence taking into account the impact of the last glacial event on the distribution of the genetic variability.

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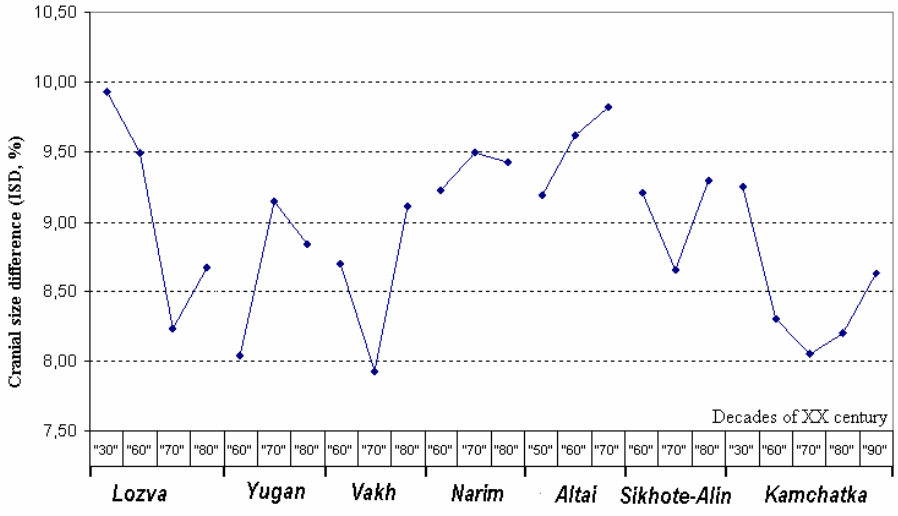

Fig. 1 ISD variations for Sable decade samples in the 20th century.

RUSSIA

Changing sexual size dimorphism in sables *Martes zibellina*

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Distinctions in size between males and females have been observed for many species of the genus *Martes* (Yurgenson, 1956; Gerasimov, 1983; Giannico and Nagorsen, 1989; Reig and Ruprecht, 1989; Holmes and Powell, 1994). I studied the cranial sexual size dimorphism (SSD) of Trans-Ural and Siberian sables using 1581 skulls from the following locations: Lozva 237, Yugan 295, Vakh 291, Narim 185, Altai 175, Sikhote-Alin 362 and Kamchatka 386.

For an estimation of distinctions between males and females I used Rossolimo and Pavlinov's (1974) index: $ISD = 100 (X_{♂} – X_{♀})/ X_{♀}$; where: ISD is size (index) of SSD in percentage; $X_{♂}$ and $X_{♀}$ are mean size features for males and females.

A similar parameter has been used in recent publications (Holmes and Powell, 1994; Abramov and Tumanov, 2003; Rozhnov and Abramov, 2006). To assess stability or variability of SSD in studied sable populations, the parameter ISD was analyzed using chronological (ten-year') samples.

The MANOVA of cranial measurements has shown that the main factor of variability in animal sizes is sex (F = 127,1-447,6; df (1,32); p <0,000001). The decade factor has demonstrated a smaller but statistically significant influence (p = 0,0014; df (30, 62)). Thus, it is possible to conclude that the chronological changes of the SSD index are not casual.

The analysis of chronographical changes of ISD in the studied populations shows mainly U and ∩ variation types of measurements (see Fig. 1). Male and female size distinctions in populations may not always be constant; the first attempt to analyze SSD dynamics confirmed the existence of such chronotrends. The chronographical fluctuations of the SSD index between ten-year samples were revealed on the example of Siberian and Trans-Urals sables. That variations have recurrent dynamics in most cases.

This investigation is supported by RFBR (Projects 07-04-96105 and 07-05-00298) and Siberian division of RAS.

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POLAND

A method of genetic identification of pine marten (*Martes martes*) and stone marten (*Martes foina*) and its application to faecal samples

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Abstract
Reliable identification of species in a given area is a basis of effective wildlife management and conservation. However, discrimination of species is often difficult, especially if two morphologically similar, rare and elusive species occur sympatrically. This is the case with pine marten *Martes martes* and stone marten *Martes foina*, two closely related mustelids that have overlapping ranges throughout central Europe. Here we describe a genetic method that allows for distinguishing non-invasively collected samples (faeces or remotely plucked hair) derived from pine martens or stone martens. On the basis of the analysis of tissue samples of 31 pine martens and 26 stone martens, we found that the microsatellite locus *MA18*—developed in another study for American marten *Martes americana*—differs substantially in allele lengths between pine martens and stone martens, thereby allowing a genetic distinction of these species. We propose combining the use of the locus *MA18* with the second one described in the literature as having the same properties. The simultaneous application of these two markers allows for unequivocal species identification. To test the practical use of this method, we analysed 365 faecal samples collected in the vicinity of the town Rogów (51°48'N, 19°53'E) in central Poland, where pine martens and stone martens occur sympatrically. We successfully identified 78 scats of stone martens and 155 of pine martens. We found that the faeces of both martens occurred inside forest complexes of the study area. Thus, it is impossible to draw any inferences on the marten species solely from the type of habitat where the faeces were found. Genetic identification of faeces or hair provides a reliable and relateively cheap method of determining the presence of two species of European martens. Its applcation enables the monitoring of changes in their distribution, which is important because of their different demographic trends and conservation status.

Patterns of winter locomotion and foraging in two sympatric marten species: *Martes martes* and *Martes foina*

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Abstract
Modes of area searching and exploratory behaviour of the sympatric pine marten, *Martes martes* (L., 1758), and stone marten, *Martes foina* (Erxleben, 1777), were studied by snow-tracking in two regions of Poland. The accuracy of identifications of the two species on the basis of their snow tracks was assessed by DNA analysis of their faeces, as collected on the tracks; identifications were found to be correct in 88% of cases. Although most activities of the two species were concentrated on the forest floor, pine martens climbed trees, moved in tree crowns, and searched the bases of tree trunks and tree hollows more frequently than stone martens. In contrast, stone martens were more inclined to search for food in brushwood and piles of wood, and visited logged areas and garbage dumps more frequently. Pine martens avoided man-made objects and barriers such as roads and passed through open areas with reluctance. Such behavioural traits make this species particularly vulnerable to forest fragmentation and human activity in forests. Stone martens often explored woodless areas and inhabited buildings, which allowed them to use habitats substantially transformed and intensively explored by humans. The future coexistence and relative numbers of the two martens in forest habitats will depend on the mode of forest management and on the existence of effective migratory corridors connecting forest patches.

Diet of sympatric pine marten (*Martes martes*) and stone marten (*Martes foina*) identified by genotyping of DNA from faeces

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Abstract: *Martes martes* and *Martes foina* occur sympatrically in most of Europe. Little is known about differences between trophic niches of these species, because martens are difficult to observe and it is impossible to distinguish between scats of both species based on their morphological features. To resolve this problem, we used DNA extracted from faeces for species identification. This method allowed us to compare the diet of the two species in the area of their sympatric occurrence in central Poland. We analysed the composition of 287 scats of stone martens and 155 of pine martens. Both species fed mainly on small rodents, birds and fruits. Although the trophic niches of both martens highly overlapped, we found significant quantitative differences in their food composition. Pine martens fed more frequently on rodents and birds, and stone martens on fruits and insects. These differences were also visable in the seasonal perspective. Although both martens exploited the same forest habitat, genetic identification of faeces allowed us to indicate significant differences in the diet of these closely related species.

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Update on the 5th International *Martes* Symposium in 2009

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As announced in the 2006 *Martes* Newsletter, planning is underway to convene the 5th International *Martes* Symposium at the University of Washington in Seattle during the summer of 2009. We also reported that one of the objectives of this meeting will be to revisit and update many of the general review/synthesis topics that were featured in the 1st *Martes* Symposium book in 1994 and in the proceedings of several subsequent *Martes* meetings. These included papers on their evolutionary history, phylogenetic relationships, distribution and status, population structure and spacing, remote detection and population monitoring, reproductive biology, habitat ecology, food habits, and translocations. Recent developments in our field will likely necessitate additional review chapters on such topics as the use of genetic data in *Martes* research and conservation, relations with snow and the potential effects of global warming, and others. We welcome any and all input from the membership, so if you have suggestions for review topics that were not covered in previous *Martes* volumes, please send them to the planning committee.

We also announced in 2006 that we would explore the possibility of convening a joint symposium on *Martes* and *Gulo*, given emerging evidence of a very close taxonomic affinity between these 2 genera, and the fact that wolverine biologists held their first international symposium in 2005. For a number of reasons, however, we have decided not to hold a formal joint meeting of these 2 groups. Instead, we plan to have at least 1 paper presented at the 2009 *Martes* symposium that explores the evolutionary and ecological relationships between these 2 genera; we will also consider similar assessments for other mustelids or mesocarnivores. Again, if you have any suggestions to offer about how best to broaden our understandings of the relations between *Martes* and other mesocarnivores, please don't hesitate to contact the planning committee.

We will announce the dates for the meeting and other important details in the 2008 *Martes* Newsletter. Thus, if you know of any other meetings or events that will occur during the summer of 2009 that we should avoid in our scheduling, please let us know as soon as possible.

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See previous issues and website for additional literature.

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