and jackals. House crows and jackals are reported to be major predators of shorebirds[1]. Poultry waste dumping is usually done on mudflats close to the mangrove patches, which are imperative foraging ground for the waders.

The nutrient-rich top soil, removed during sand mining, is recouped by the soil carried in tidal waves. As this soil is devoid of polychetes (the major share of food for the birds), the foraging system of shorebirds will be affected. Twenty-year-old observations have highlighted that coir rotting[4,5] and bird hunting[5] were the major threats to the ecosystem. Presently these problems are under control, as a result of strong protests by the locals and environmental activists. But waste dumping and sand mining need to be controlled. In addition to these factors, natural processes such as proliferation of mangroves and increasing level of sand-bed deposition on mudflats are also exerting pressure. The 8 ha of mudflats provides food security to more than 4000 migratory waders annually – the density has increased to 500 individuals/ha.

Although some studies have highlighted these problems[1,4–6], no serious attempts have been made hitherto to evaluate the effect of these processes on the population status of water-birds and other organisms in this ecosystem. In this context, we emphasize the need for such a study and for developing science-based management mechanisms, with the involvement of local stakeholders.

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Use of recycled stone tools in the prehistoric culture of Mandla

The significance of archaeological sites in Mandla, Madhya Pradesh, for clear evidence of continuance of a microlithic tradition down to the historical recent time (as recent as the arrival of electricity) has been discussed in a brief communication published in *Antiquity*'s Project Gallery (http://www.antiquity.ac.uk/projgall/roy/index.html) and in other articles[1,2]. Use of recycled stone tools in prehistoric tool industry has been reported from several places around the world[3,4]. In Mandla, the evidence of using recycled tools is interesting and has methodological bearing in prehistoric archaeological studies. Roy[2] gives some examples on the use of recycled tools in the prehistoric tradition of Mandla.

Evidences of using recycled stone tools are as follows: (i) Use of recycled tools by fresh trimming of the working edge. In such cases, the original specimen remained without much change (Figure 1). (ii) Use of recycled tools after considerable reworking, such as the entire working edge made afresh. Signs of the original specimen are still clear (Figure 2). (iii) Use of recycled tools as raw material for fresh knapping. Large tools of earlier phase had been used in microlith production. The process had destroyed the original specimen completely such that evidences of the recycled tools being used were not clear, particularly when natural rock surface and possible knapping scar are not distinguishable. (iv) An extremely rare case was of a relatively fresh microlithic core found to bear old patinated flake scars, proving that large tools of an earlier phase had been extensively and exhaustively reused as raw material in microlithic manufacturing. (v) Successive reuse of recycled stone tools over a long time is also evident from old and new flake scars.

Figure 1. An elongated flake (8.8 × 3.8 × 2.8 cm) re-used as scraper; relatively fresh flake scars make the working edge.

Two important observations on the use of recycled stone tools are: (i) discarded large tools of earlier cultures had been reused by relatively recent microlith makers, and (ii) recycled stone tools had been used repeatedly over a long period of time.

Evidence of using large tool remains from earlier tradition by microlith makers was not readily available, as the process of microlith knapping would destroy any evidence of large tools being reused. This condition inadvertently shows that prehistoric interpretation perhaps grossly evaded an archaeologist's attention on such evidences. In Mandla, a core that has been incidentally recovered bears clear patinated flake scars of an earlier phase proving that large tools had been used in microlith making in Mandla (Figure 3). Once this is confirmed, tools bearing flake scars from previous removal could be identified fairly easily in Mandla tool assemblages.

How extensive the practice of using recycled large tools in microliths manufacturing had been in prehistoric culture would judge the extent of destruction of large tool cultural remains by subsequent microlith makers. In Mandla, hundreds

Figure 2. A core tool (9.5 × 7.5 × 6 cm) re-used as scraper (***a***, closeup view of the freshly prepared working edge; ***b***, the dorsal side of the specimen; ***c***, the closeup view of old and new flake scars; ***d***, the ventral side of the specimen).

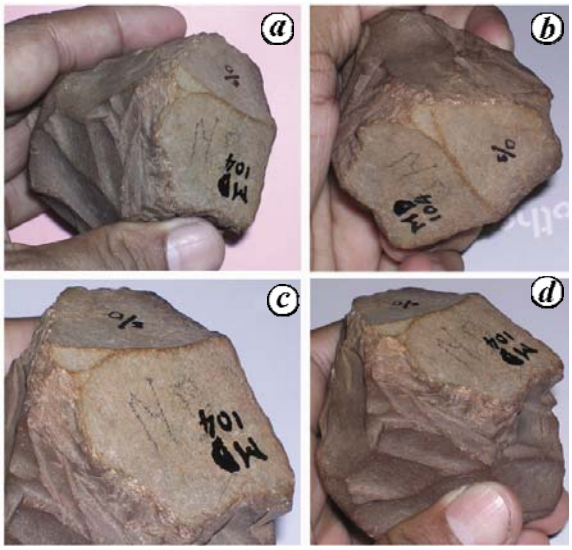

Figure 3. A core on unidentified recycled specimen (7.2 × 6.5 × 5.5 cm) (***a***, ***b***, ***c*** and ***d***, are four facets of the same showing two old patinated flake scars from earlier use; the flake scars are confirmed human works).

of stone tools have been recovered bearing signs of having been prepared from recycled large tools of an earlier phase. Thus, the large tool cultural remains of an earlier phase had possibly been greatly destroyed by subsequent microlith makers. Archaeological sites or cultural remains, whether based on ruins of earlier cultures (i.e. previous large tools users) or not, must be carefully studied to understand the Stone Age history of a region or the local cultural chronology. This has great methodological significance.

Successive use of recycled stone tools, over a long timeline, as evident in Mandla, is a significant observation. Flake scars of differential patination demonstrate successive reuse of a stone tool over a considerably long timeline, although it is not always convincing/true that all of them have resulted from human works.

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Butterfly fauna of the Keibul Lamjao National Park, Manipur, North East India

Butterflies are one of the most fascinating creatures symbolically representing beauty and grace. India is a paradise for butterflies[1], with a record of nearly 1501 species[2], of which, the presence of nearly 962 species is known from the biodiversity rich hotspot sectors of North East India[3,4]. Records of the Zoological Survey of India published under the state fauna series have shown the occurrence of 106 species from Manipur[5–7]. A study carried out in the ecological parks of Bishnupur District, Manipur, has revealed the presence of 136 species[8,9]. Here we report the diversity of butterflies from the highly protected natural habitats of the Keibul Lamjao National Park (KLNP), which is the only floating park in the world. It covers a total area of 40 sq. km and is situated between 24°27′N and 24°31′N lat. and 93°53′E and 93°55′E long. The park comprises distinct geographical zones such as 'Phumdis', which is a floating surface formed by conglomeration of vegetation along with the dead and decaying organic matter floating over the water body. A number of hillocks, namely Pabotching, Toyaching, Chingjao and Chingmeiching exist in and around the National Park. The forest sector on the hillock side surrounding the park exhibits features similar to that of east Himalayan moist mixed deciduous forest. Such unique ecological condition with abundant floral diversity and salubrious climate (14 ± 3°C and 28 ± 2°C; 70 ± 5% relative humidity and rainfall ranging from 1500 to 2000 mm per annum)[10,11] forms a conducive habitat for